# The United States MILLER

Published by E. HARRISON CAWKER. { VOL. 16, NO. 2. } MILWAUKEE, DECEMBER, 1883. {Terms: $1.00 a Year in Advance. Single Copies, 10 Cents.


## PRACTICAL MILLING.

By JAMES HIGGINBOTTOM, M. E., of Liverpool, England.

[A paper read before the National Association of British and Irish Millers, Oct. 29, 1883, advance proof sheets of which were furnished us through the courtesy of William Denham, Esq., publisher of *The Miller*, London.]

Mr. President and Gentlemen.—It is certain that the system of milling which will be adopted in the future by merchant millers is that of gradual reduction, because the public demand for white bread is constantly increasing, and the only possible way in which the miller can profitably meet such demand is by gradual reduction milling.

Gradual reduction milling is being slowly but surely adopted by British millers, and the movement, which commenced many years ago in Hungary, is now extending to every other country. Vast sums of money are being expended by millers in almost every direction to improve the quality of their flour products. In many cases such money is being spent most foolishly for the want of a thorough insight into the principles which guide the processes of gradual reduction milling.

By the term gradual reduction is meant the breaking and treatment of the wheat in progressive stages for the purpose of eliminating the bran and the germ. These stages are definitely and strongly marked, and it is proposed in this paper to enquire closely into the manner of conducting the various stages, such as practical experience has proved to be the most conducive to good results. Also to generally examine into the practical manipulation of wheat for the production of flour. In the first place, before gradual reduction can commence to the greatest advantage, it is necessary to thoroughly perform the cleaning of the wheat. All foreign substances and seeds should be extracted, the beards should be removed, also as much of the outer silicate skin, as can be taken off without injury to the under skins of the wheat. For the extraction of refuse larger or smaller than the wheat a revolving cylinder covered with clothing having round holes is thoroughly reliable and self-cleaning. For the extraction of foreign seeds of a long or a round shape Trieur cylinders are very reliable and effective. Another function of the Trieur cylinder of great importance is that of sizing the wheat for length. It is the only machine which can be relied upon for this purpose. The Trieur cylinder is thus absolutely indispensable where ending mills are used for removing the beards of the wheat.

By the use of ending mills about ¼ per cent. of the weight of the wheat, in beards and dust can be removed, nearly all of which in ordinary milling becomes incorporated with the flour.

The outer skin of wheat is usually coated with closely adhering dirt. *The best way of removing this dirt is to remove the outer skin and the dirt with it.* The outer skin is easily detached, and it is very friable. A large proportion of the impurities to be found in flour arises from these outer skins. This can be easily understood when it is remembered that during the breaking up of the wheat the outer skin is subjected to exactly the same severe treatment as the inner kernel of the wheat. The outer skins are easily ground to powder by the action of millstones, but they become detached in large flakes during the breaks of the wheat on the gradual reduction system, providing that the working faces of the break machines are not set too close, and that they work with a moderate speed and pressure. It is of importance to remove as much as possible of these outer skins before any flour is made, because if this is done the after purification of the middlings is very much assisted.

Good wheat cleaning affords good break flours; a thorough system of wheat cleaning, and the removal of as much as possible of the outer skins, gives a very perceptible advantage in the qualities of these flours. Ordinary wheat cleaning consists generally in giving the wheat a good beating in smut machines, combined with after polishing or brushing, it having become almost an article of belief with many millers that if the wheat be smooth and well polished it is all that is necessary; whereas, in point of fact a polish can be given to wheat by attrition; making it shine as if it were French polished, but such polish covers the dirt in the pores of the outer skin, and is therefore a useless waste of power. It is a good thing to give the wheat a severe knocking about in a smut machine, and for this purpose almost any arrangement of machine is good. It cannot be said that wheat is well cleaned and prepared unless the beards are removed, together with as much as possible of the outer dirty skins. Experience shows that ending mills and wheat scouring machines with working faces of emery composition are the most reliable and durable in practice. The ending mill can only remove the beards from the wheat, but a well-designed scouring machine should be capable of scouring to any desired extent suitably to the nature of the grain.

In practice it is advantageous to remove from ¾ to 1½ per cent. of the weight of the wheat, of the outer skins, by the scouring machines, before the wheat is sent on to the gradual reduction processes.

After the scouring operation it is good to give the wheat a severe attrition treatment, and an aspiration for the purpose of removing the loose, partially adhering shreds of outer skin.

From the foregoing remarks it will be understood that the wheat has been divided into two or three distinct lengths for the purpose of ending, but after the ending mills the wheat may be mixed together before going to the scourers. After the scouring comes the polishing and aspirating operations. After the polishing operation the wheat is in condition for the commencement of the *gradual reduction system*. At this stage an important step should be taken which will materially conduce to the value of the after results. The wheat from the polishing and aspirating machines is of all sizes as regards length and diameter. The length of the wheat does not affect the after operations, but the diameter of the wheat considerably affects the quantity and quality of the first break flour. Machines should be used to divide the wheat into two or three distinct diameters, or, say, into three classes of wheat, each class being gauged for thickness or diameter. Each of the different classes should be sent to its own first break machine. If this division of the wheat is carried out carefully, each grain of wheat may be split through the crease, and the quantity of the first break flour will be much less than if wheat of all thickness is sent to the first break machines. It is impossible to devise a machine which can satisfactorily split thick grains and thin grains at the same time.

In making a first break a quantity of first break black flour is made, varying from ¼ to ¾ per cent. of the weight of the wheat. This flour is of a very low quality and should be kept out of the baking flour. Besides the first break flour there is produced a quantity of fine dunst which will pass through silk cloth having 100 meshes to the inch. This dunst is of a poor quality, and as it will only make a flour of a low quality, it should therefore join other similar products further on in the system.

The other products of the first break are divided into two distinct kinds of material, namely, semolina, germ, and middlings, mixed with thin flakes of outer skins, and cracked wheat mixed with thin flakes of the outer skins of the wheat.

The semolina also has a proportion of fixed or attached bran upon the larger particles. An important operation at this stage is to pass the cracked wheat through a brush machine, to take off the adhering dark flour, and to further loosen the outer skin coatings before the cracked wheat is sent on to the second break. On some very soft varieties of wheat this operation may be omitted with advantage, but with hard wheats it is best to use a brush. After the cracked wheat has passed through the brush machine it should be passed through an aspirator, to extract the detached flakes of thin outer skins.

The cracked wheat is now ready to pass to the second break. The wheat is divided into different thicknesses before the first break, but all the cracked wheat is run together to the second break machines. The great object of the second break is to slightly reduce the cracked wheat, for the purpose of making as much large semolina as possible, with as small a flour production as possible. It is also found that by gently breaking the wheat the germ becomes dislodged, without being broken into small particles. This is a point of great importance, because, if the germ becomes much broken it afterwards entails much trouble and expense to accomplish its complete removal from the semolina and middlings.

The semolina, germ middlings, dunst and flour mixed with thin bran flakes, made by the second break are separated from the second break wheat, and sent to join those from the first break. The broken wheat from the second break contains a quantity of thin flakes of outer skins, which are extracted by an aspirator, before the wheat is passed on to the third break machine.

The third, fourth and fifth breaks and aspirations are made in a manner exactly similar to that of the second break. It is better to make seven breaks than six, and eight breaks are better than seven, but assuming that only six breaks are being made, then, the break machines are so set that at the end of the fifth break the bran shall be free from adhering particles of kernel, thus leaving the sixth break to scrape or finish the bran.

The products of the sixth break are clean bran, fine middlings, dunst, and sixth break flour. The tendency of all gradual reduction machines is to diminish the size of the bran at every break. It is therefore usual to pass the six break bran through smooth rollers with slow speed and enough pressure to widen out or flatten the bran to a marketable size. The flour from the sixth break averages about 1 to 1½ per cent. of the weight of the wheat, and its quality is entirely regulated by the amount of the kernel left on the bran after the fifth break.

The sixth break fine middlings are purified twice over, and sent to join the middlings of the other breaks. The sixth break dunst joins similar products further on in the system. The aspirations from the first, second, third, fourth and fifth breaks, and the aspirations from the semolina and germ produced by these breaks, are all collected automatically as a finished product. They amount, on unscoured wheat, to one or one and a-half per cent. of the weight of the wheat; on scoured wheat the per centage is less.

The semolina, germ, middlings, dunst, and flour of the second, third, fourth and fifth breaks join the semolina, germ and middlings of the first break, and the fine purified middlings of the sixth break. The united material is sent to a chief separating reel, which produces two qualities, viz.: semolina and germ, and middlings free from germ, with dunst and flour. This semolina and germ passes to an aspirator to extract the light, thin flakes of outer skins, and from thence to the *germ extraction system*. The separation of the semolina and germ from the broken wheat is made by ordinary reels covered with coarsely perforated metal with round holes. It is of importance that the holes should be large enough to allow the largest of the germs to pass through whole and unbroken, so as to prevent any of the larger germs being sent from one break of the wheat to the other.

It is found in practice that about one-third of the germ is dislodged in the first break, another one-third in the second break, and the remainder, mostly consisting of the smaller germs, in the third and fourth breaks. The actual weight of the pure germ in 100 lbs. of wheat averages about two lbs.; 100 lbs. of pure germ contains from 10 to 15 lbs. of oil. The ends of a germ particle terminate in a fine point, and it is a crucial test of the degree of perfection of the working of any wheat-breaking machine, if it can detach the germ without breaking off these pointed ends. In breaking down the wheat the machines should be so set that the germ is detached whole and unbroken even amongst the semolina of the fourth break. The system of germ extraction advocated is that of gradual reduction of the semolina and germ by means of smooth iron rollers; the object being the extraction of the germ with the smallest possible production of flour, and the largest production of middlings from the semolina. The breaks on the semolina are accomplished as follows:

The semolina and germ from the aspirator is passed the first time through smooth iron rollers, the rolls being set rigidly at just such a distance apart as will crush the soft semolina into middlings without causing the same to become pressed into cakes, and at the same time slightly flatten the germ. The meal from the first break rollers is passed through an ordinary separating reel covered with coarse silk; this silk prevents any of the germ from passing through. The middlings dunst and the flour which passes through the silk are free from germ, and they join the middlings dunst and flour from the chief separating reel after the breaks upon the wheat. The material from the tail end of the silk is passed a second time through smooth iron rollers, the rolls being set rigidly at a smaller distance apart to perform the second break without producing much flour, and to still further crush or flatten the germ.

The meal from the second break rollers is passed through an ordinary separating reel covered with coarse silk cloth, which will permit the middlings and flour to pass through, but which retains and throws the flattened germ over the tail end. The middlings, free from germ, with its dunst and flour, made by the second break rolls, are sent to join those from the first break rolls. The tails from the second germ reel are sent to the third germ rollers, which are preferably of porcelain, as this material makes a better finish of the germ tailings. These last rolls are set close so as to make a finish of the germ tailings, and the meal from the same is passed to a centrifugal dressing reel, which gives finished germ flour, fine finished germ meal, and coarse finished germ tailings.

The middlings, dunst and flour, free from germ arising from the six breaks upon the wheat and the two breaks upon the semolina and germ, are sent to a centrifugal dressing reel, which dresses out the break flours and divides the middlings from the dunst. The dunst from this centrifugal is again redressed to thoroughly extract all the flour therein. Of all the operations in modern gradual reduction milling, it is probable that the most loss arises from defective redressing of the dunst. The fine middlings are then purified, and afterwards reduced into first quality flour upon millstones. The middlings from the tail of the centrifugal are also purified, and afterwards reduced into first quality flour upon millstones. The fine and coarse purified middlings are of a high class quality and free from germ and bran. They are reduced to flour in three grindings upon millstones, and the residue between each grinding is purified, thus the middlings are thrice purified, viz.:

[CONTINUED ON PAGE 27.]

# UNITED STATES MILLER.

PUBLISHED MONTHLY.

OFFICE Nos. 116 & 118 GRAND AVENUE, MILWAUKEE, WIS.

Subscription Price.....$1 per year in advance.
Foreign Subscription.....$1.50 per year in advance.

MILWAUKEE, DECEMBER, 1883.




### *BUCKWHEAT.*

The season has been unfavorable to this grain. Grown in the latter part of the season, it is liable to damage from early frost. It was injured seriously by the frosts of the second week of September, and makes but an average of 11.7 bushels per acre in New York and 11 bushels in Pennsylvania, states which produce two-thirds of the crop. It is not grown in the South, and only to a very limited extent in the West. Maine produces twice as much as Illinois, and Massachusetts more than Missouri. The product may approximate 1,000,000 bushels. Had the late sown escaped the frost there would have been 13,000 000.

W. W. ROBINSON of Ripon, Wis., has recently been calling on Wisconsin millers and demanding royalty from them for use of a patent valve used in flour packers claimed to be an infringement of A. M. Hobbs' patent No. 168,020, issued Sept. 21, 1875. Hobbs is dead. The valve claimed to be an infringement is like the ordinary damper used in a stove-pipe. It is used on the Barnard & Leas and other flour packers. Messrs. Barnard & Leas express themselves willing to defend any action brought against any of their customers for infringement, and request millers to inform them of any further demands made of them. Mr. Robinson will doubtless find it difficult to collect any royalties. Mr. S. H. Seamans, of Milwaukee, Secretary of the Millers' National Association, also desires to be informed of any further demands.

HENRY WARD BEECHER in a recent sermon made the following remarks which appear to us to have the "right kind of a ring" to them:

Some men think that because they have had no tumultuous experience that they are not converted. That is not the case. Where a man says to himself, "Here, I am not satisfied with my present mode of life, and I am going to change it," he is convicted. A sudden change from absolute darkness to absolute light is not necessary. All education is gradual, unfolding, A man who gets up in meeting and relates a most startling experience that he has had of sudden and complete change is not necessarily to be set down as a liar, but neither is he to be taken as a leader. I heard a man say once: "I smoked and chewed and snuffed at a terrible rate, but when I found the grace of God from that instant I never had the slightest desire for tobacco." Well, setting aside the theory that he lied—which may be uncharitable—I will say that out of forty millions of men he is the only one that could say that, and if the forty millions of men waited until they got rid of their lusts in that way they would forever wallow in them. I do not want you to imagine that here is a gospel churn into which you are to be poured and come out butter. What I want to know is, are you discontented with the way in which you are living, and do you want to change? To join the church for business reasons is mean; to join the church for fear you will otherwise be damned is meaner yet. To try to indulge in everything that is low and vile in this life, and then top off the loaf with God's sugar of mercy, is very mean.

AMANDUS KAHL, of Hamburg, Germany, in describing Bauermeister's Centrifugal Dressing Machines, patented in Europe and the United States says: The principle upon which sifting or dressing machines have been manufactured hitherto, was, to rub the flour as fast as possible through the silk by placing the beaters close to the silk, and to use very fine gauze in order to keep back the pieces of bran and groat.—Bauermeister's patent machine introduces the following improvements: The beaters in this machine will not rub the flour directly through the silk by pressure, but the meal, being first turned off from the gauze by the outer flyers, is (owing to their parabolic shape) thrown towards the centre of the machine and the sifting is effected by a strong current of air caused by the ventilating beaters, which revolve at a distance of 3 to 4 inches from the gauze and by which current of air the flour is forced through the meshes of the silk; the particles of bran and other impurities which are generally of a flat and longish shape cannot be blown through the gauze, but are carried by the air current towards the outlet. As there are successive air currents crossing each other in the machines, the particles of meal and bran are thrown continually against each other, by which the gluten is rubbed off more completely from the husks and contributes to increase the quantity of pure flour produced. By the old method the silk gauze employed is generally No. 13, 14 or 15, yet it is almost unavoidable to prevent some coarse particles of husk or groats from being rubbed through, which causes at the same time the gauze to be worn through very quickly, whereas with Bauermeister's machines, a coarser silk, say No. 11 and 12 is not only sufficient, but is preferable and will produce a perfectly clean and pure flour of a superior powdery nature, while the silk gauze will last 2 or 3 times as long. Moreover the process of sifting is carried on much more expeditiously than with the old machines The principal advantages are: 1. Great economy in the silk gauze. 2. Largely increased yield of flour. 3. Important improvement in the quality. The outlet (end) of the drum in Bauermeister's machines is also very ingenious and practical. It is, with the exception of five narrow movable openings at the circumference, tightly closed with felt or india rubber ring and these five outlets are opened so far only as to admit of the free discharge of the tailings, leaving no escape to the currents of air produced by the inner ventilator. These therefore must find their way through the meshes of the silk only, keeping them open and clean, thus contributing to improve the quality.

### *EVILS OF THE CONTRACT SYSTEM.*

ONE of the evils, without any mitigating or redeeming features, that at present afflict the milling trade in this country, is the pernicious practice of building and remodeling mills by contract. At the first this will not by any means be taken as a self evident proposition, yet we believe that any observing and candid man, whether mill owner or mill builder, who will give the matter a little careful consideration will become convinced that the contract system is an evil one, and that mills built by contract are as a general rule inferior in construction and cost more in the end than those where the owner knows what he wants, pays for what he gets, and gets what he pays for, and does not have to rely solely on the guarantee of the builder for the successful working of his mill when it is completed. So far as we know, the UNITED STATES MILLER is the first to call the attention of the trade to the inconsistency of the contract system and the evils attendant upon it both to the mill owner and the mill furnishers. That all of the former are not blind to these evils is proved by the fact that among the most extensive mill owners the majority in building or remodeling do not contract the work; and one of the heaviest mill furnishing firms in this country has several times expressed a determination to refuse to take contracts for building complete mills, preferring to submit to a present loss in trade rather than to continue suffering both in purse and reputation in further competition for trade under the contract plan.

It may be argued: "Why not build complete mills under contract as well as to contract for the building or for digging the cellar?"

The answer is, that when the miller contracts for the excavation he knows, or is supposed to know how large a hole in the ground he wants, and the contractor knows the character of the soil he is to remove, and that the miller buys only a certain amount of the labor of men and teams, preferring to pay the contractor a small profit rather than to have the trouble of looking after the work. The transaction is a simple one; neither party takes any chances, unless he is ignorant or careless in his estimates. The question, whether the contract has been performed, or not, is one easily determined. The "hole in the ground" is the same whether dug by owner or contractor. The erection of the building is not so simple an undertaking, and though the larger portion of this work is done by contract we are inclined to believe that the best buildings are those built "by days work," in which nothing is slighted, and on every part of which the eye of the master has rested. Inasmuch as the building is more complex in structure than the excavation, the evil of doing the work by contract becomes more apparent. In so far as the building itself is far simpler than the machinery with which it is to be filled, the evils of the contract system, when considered in comparison, are less. In the case of the building, if the specifications are carefully drawn, and the standard of the materials to be used is stated, there is something to settle by, and both owner and contractor are protected from unreasonable demands from the one, or slighted and unsafe work by the other. We are not arguing that contractors are generally dishonest, or that owners are generally unreasonable or extravagant in their demands, yet a goodly proposition of contracts have to be settled either by compromise or litigation, and the whole system is fruitful of annoyance to all concerned. The instinctive autagonism of buyer and seller is increased by the manifold chances for "kicking" on both sides. The evils are intensified by the practice of "letting to the lowest bidder" and accepting the lowest bid without reference to the goods to be furnished. The common saying: "Built by contract," is engraved, as it were, on more than one building where, whatever of good there was in design or solidity in construction, has been sacrificed to the short-sighted policy of the owner. Penny wise and pound foolish, is always bad policy, and especially so where the penny saved in first cost entails a constant expense for repairs ever afterwards.

But if, as is generally admitted, the contract system is fruitful of poor buildings, there is much more of force in the arguments against it, when applied to the complex structure of that piece of machinery, the modern flouring mill. In the old times when mills were all alike save in size; when the merchant mill was simply a custom mill on a little larger scale; when one overshot wheel was like another, save in length, diameter and number of buckets, and when the millstone, elevator and bolting reel were all the machinery needed, we can readily see that a mill could be built by contract with more certainty of being built well, or rather with less certainty of being built poorly. Then there was some kind of a standard by which to measure the work. Now there is none. The changes of the ten years past have unsettled all ideas regarding milling, and "systems," are as numerous as there are millers to listen to their advocates. The owners of the larger mills who have spent every year thousands of dollars in experimenting and trying new methods, are not likely to be led astray by every new issue; but the owners of small mills, having neither time, means nor in many instances inclination, to investigate closely the merits of each new device, and desiring above all things to "make the change as cheaply as possible," are ready victims to the man who "has a reduction machine," which with half the expense is "able to do all that the rolls will do," and who will contract to change the mill for a certain sum and "guarantee results to equal any roller mill in the country." That the guarantee in nine cases out of ten is not worth the paper it is written on, is scarcely ever taken into consideration. The influence of this, when taken in connection with building mills by contract, is easily seen. The mill owner, impressed with the idea of getting his mill built or remodeled as cheaply as possible, advertises by correspondence with every mill furnisher, big or little, and with the maker of every special machine, whether good, bad or indifferent, that he will let his mill by contract to the lowest bidder, and will exact a guarantee of the most unreasonable kind as one of the conditions of the contract. The result is, that the work is let at a price that precludes any possibility of a first-class job, and the mill after being a bone of contention between owner and contractor while the work is in progress, is a botch job in the end, and starts up without any chance of filling the guarantee. If the owner is easy and not disposed to exact the fulfillment of the contract to the letter, he will probably settle, if otherwise, he will bring in a big bill of reductions and damages, and force the contractor to admit them in whole or in part. In either case neither party to the contract is satisfied, and each thinks he has been swindled. The mill owner has a cheap mill and much costly experience, and the contractor in most instances has an unsettled account in his books, that will stand months, and likely enough years, before a final settlement is reached. We are aware that to this, as to every other question there are two sides, and that millers have good reason in many instances to complain of unfair treatment by mill builders where the job has been done "by the piece and pound," but this is not so expensive to the owner as to have a poor mill when completed. The old adage "of two evils choose the least," is of good application in mill building, as elsewhere, and we believe the mill owner who looks into the matter thoroughly will not have many mills built by contract.

[For the UNITED STATES MILLER.]

### *THE TARIFF.*

BY JOHN W. HINTON, OF MILWAUKEE.

In the November number of the UNITED STATES MILLER, some points were given, showing how prolific of good had been our Protective Tariff in "promoting the general welfare." Reference was made in these columns sometime since to the disastrous effect of free trade in grain to the Roman Empire, once the "Mistress of the World."

A miller has requested us to prove the assertion from "historical facts." For that purpose, we quote the following from Archibald Allison, LL.D., author of the History of Europe, taken from pages 531-2 and 3 of Vol. 2, Allison's Essays, Edinburgh edition, 1850:

"Disastrous as have been the consequences of a free trade in grain to the Roman States, alike in ancient and modern times, it was introduced by its rulers in antiquity under the influence of noble and enlightened principles. The whole civilized world was then one State; the banks of the Nile and the plains of Libya acknowledged the sway of the Emperors as much as the shores of the Tiber or the fields of Campagna. When the Roman Government, ruling so mighty a dominion, permitted the harvests of Africa and the Ukraine to supplant those of Italy and Greece, they did no more than justice to their varied subjects. Magnanimously overlooking local interests and desires, they extended their vision over the whole civilized world, and

'View'd with equal eyes, as lords of all'

their subjects, whether in Italy, Spain, Egypt or Libya. Though the seat of government was locally on the Tiber, they administered for the interests of the whole civilized world far and near. If the Campagna was ruined, the Delta of Egypt flourished! If the plains of Umbria were desolate, those of Libya and Spain, equally parts of the empire were waving with grain. But can the same be said of England, now proclaiming a free trade in grain, not merely with her colonies or distant provinces, but with her rivals or her enemies? Not merely with Canada and Hindoostan, but with Russia and America?—with countries jealous of her power, envious of her fame, covetous of her riches. What should we have said of the wisdom of the Romans, if they had sacrificed Italian to African agriculture in the days of Hannibal?—if they had put it in the power of the Carthagenian Senate to have said: 'We will not arm our galleys; we will not levy armies; we will prohibit the importation of African grain, and starve you into submission'? How is England to maintain her independence if the Autocrat of Russia and the President of America, by issuing their orders from St. Petersburg and Washington, can at any moment stop the importation of ten millions of quarters of foreign grain—that is, a sixth of our whole annual consumption? And are we to render desolate our own fields, to render penniless our home customers, not in order to promote the interests of the distant parts of our empire, but in order to enrich and vivify our enemies?

It is said that public opinion runs in favor of such a change; that the manufacturing has become the dominant interest in the State; that wages must at all hazards be beat down to the continental level; and that, right or wrong, the thing must be done. But be the present opinion of the majority what it may, that will not alter the nature of things; it will not render that wise which is unwise. Public opinion in Athens, in the time of Demosthenes, was nearly unanimous to apply the public funds to the support of the theatres instead of the army, and they got the battle of Chæronea and subjugation by Philip for their reward. Public opinion, in Europe, was unanimous in favor of the Crusades, and millions of brave men left their bones in Asia in consequence. The Senate of Carthage, yielding to the wishes of the majority of their democratic community, refused to send succors to

Hannibal in Italy; aud they brought in consequence, the legions of Scipio Africanus around their walls. Public opinion, in France, was unanimous in favor of the expedition to Moscow: 'They regarded it,' says Segur, 'as a mere hunting-party of six months;' but that did not hinder it from bringing the Cossacks to Paris. The old Romans were unanimous in their cry for cheap bread, and they brought the gothic trumpet to their gates from its effects. A vast majority of the electors of Great Britain, in 1831, were in favor of Reform; out of 101, 98 county members were returned in the Liberal interest; and now they have got their reward, in seeing the Reformed Parliament preparing to abolish all protection to native industry. All the greatest and most destructive calamities recorded in history have been brought about, not only with the concurrence, but in obedience to the fierce demand of the majority. Protection to domestic industry, at home or colonial, is the unseen but strongly-felt bond which unites together the far-distant provinces of the British Empire by the firm bond of mutual interest. Withdraw the cement, remove the bond, and the mighty fabric will crumble into ruins."

An attentive reading of the above, so replete with historical facts, may open the eyes of some readers to the benefits of "protection to domestic industry," and show the abject condition to which free trade, so called, may reduce a country, never forgetting that "History is philosophy teaching by example."

## *BREAD MAKING.*

By W. Jago, Esq., F. C. S.

[A paper read before the National Association of British and Irish Millers, in London, Oct. 29, 1883.]

*Sir and Gentlemen*:—It was with the feeling that a great honour was being done me that I read the communication from your energetic secretary, asking me to read a paper on "Bread Making" at this your annual meeting. I explained to him that my standpoint was that of the chemist rather than of the practical miller or baker, and, consequently, any remarks of mine must deal with the science rather than the art of bread making. With that knowledge his cordial invitation was again repeated, and as a result I now stand before you, feeling, nevertheless, considerable diffidence in addressing an audience composed of gentlemen whose acquaintance with bread and all that pertains to it is of such a thoroughly practical nature.

I purpose, in the short time of our disposal, to first give you as a sort of text, the results of a series of analysis of some different varieties of wheat, and for comparison with them those also of some other kinds of grain:

| Variety of Grain. | Water. | Fat. | Insoluble Albuminoids | Soluble Albuminoids | Gum & Sugar | Starch. | Cellulose. | Ash. | Authority. |
|---|---|---|---|---|---|---|---|---|---|
| Flemish Wheat | 14 6 | 1.0 | 8.3 | 2.4 | 9 2 | 62 7 | 1 8 | ... | Pellgot. |
| " | 15.2 | 1.5 | 12 7 | 1.6 | 6 3 | 61.3 | ... | ... | " |
| Odessa | 14.4 | 1.0 | 13 8 | 1.8 | 7.2 | 59.9 | 1.5 | 1.9 | " |
| Poulard Bleu Wheat | 13.2 | 1.2 | 16 7 | 1.4 | 5.9 | 59.7 | .. | 1.9 | " |
| " Dry Year | 14.5 | 1.1 | 11 8 | 1 6 | 5 4 | 65.6 | .... | ... | " |
| Hungarian Wheat | 13 5 | 1.1 | 19 1 | 1.5 | 6.0 | 59 8 | ... | ... | " |
| Egyptian " | 15.2 | 1.8 | 8 9 | 1 8 | 7.3 | 63.6 | .... | 1.4 | " |
| Spanish " | | | 10.9 | | | | | | |
| Old Wheat | 11 1 | 1 2 | 13 2 | | | | | | |
| Barley | 12 0 | 2.6 | 7.2 | | | | | | |
| Rice | 10.8 | 0.1 | | | | | | | |
| White English Wheat | 14 5 | 1.2 | 11 0 | | 3.8 | 62.3 | 8.3 | 1.7 | Graham. |
| Fine Wheat Flour | 13 0 | 0 8 | 10 5 | | 4.2 | 52.7 | 11.5 | 2.8 | " |
| Wheat Bran | 14.0 | 4.0 | 15.0 | | 1.6 | 78.8 | 0.2 | 0.9 | " |
| | | | | | 44.0 | 74.3 | 17.0 | 6.0 | Church. |
| | | | | | | 69.0 | 2 6 | 1.7 | " |

The figures given represent percentages of the different constituents. It will be seen that the analyses are by different chemists; they have also been made at different times, and as the methods employed have varied, the results are not strictly comparative.

I should have much liked to have made a series of analyses specially for this paper, but could not possibly do so in the limited time since I was asked to write it. We shall therefore have to make the best use we can of these older ones obtained from good authorities.

All, or most of you, will doubtless be familiar with the nature and properties of these different grain constituents. Still, it will be as well, perhaps, to briefly refer to such of their characteristics as are of importance to the baker. Starch, of which the main body of the grain is composed, consists of extremely small, yet perfectly formed cells, each of which has an envelope of cellulose, and is filled with fine particles of starch. The object of the miller is to thorougly separate these from each other, at the same time carefully avoiding crushing the walls of any of the granules; for this purpose he modifies his methods and uses stones or rolls, or a combination of the two, according to the nature of the wheat. Starch, from the chemical point of view, is a compound of the three elements, carbon, oxygen and hydrogen; it is, when dry, a very stable body, that is, it has no tendency to rapid decomposition. It is a valuable food stuff, and exists in the seed as a reservoir of material from which the growing plant derives its sustenance. Cellulose, which has the same percentage composition as starch, may be described as the wrapping material used in "making up" the different parts of the plant; it occurs in an almost pure state in cotton wool or white blotting-paper. The gum of wheat and other grains is the variety known as dextrin, and again has the same percentage composition as starch; under the influence of heat starch is converted into dextrin; this conversion takes place much more rapidly in the presence of certain other substances to be hereafter referred to. The sugar of grain, which occurs in malt, and to a much larger extent in wort, that is, the infusion of malt in warm water, differs in composition from starch only in that it contains a little more hydrogen or oxygen. This variety of sugar is usully termed maltose, and, like dextrin, is a result of the decomposition of the starch of the grain. I will here venture on a chemical equation in explanation of this change; it will help those who have ever studied chemistry, while it will not render the subject more difficult to those who have not done so.

$$C_{18}H_{30}O_{15} + H_2O = C_6H_{10}O_5 + C_{12}H_{22}O_{11}.$$
Starch. Water. Dextrin. Maltose.

This, being interpreted, is one molecule or little particle of starch containing 18 atoms of carbon, 30 of hydrogen, and 15 of oxygen, combines with 1 molecule of water containing 2 atoms of hydrogen and 1 of oxygen, and produces 1 molecule of dextrin, which consists of 6 atoms of carbon, 10 of hydrogen, and 5 of oxygen, and 1 molecule of maltose containing 12 atoms of carbon, 22 of hydrogen, and 11 of oxygen. Both dextrin and maltose, it should be added, are destitute of any cellular structure.

The next group of compounds which are of importance to us are the albuminoids, soluble and insoluble; these bodies will require our most careful attention. The composition of albuminoids is much more complex than that of starch; in addition to three elements, carbon, hydrogen and oxygen, there are also present nitrogen and sulphur. To the baker the division of albuminoids into the soluble and insoluble varieties is absolutely necessary in order to enable him to determine from them the value of the flour. When flour is kneaded in a stream of cold water the starch and soluble albuminoids are washed out, and there remains an insoluble sticky mass of matter to which the name of *gluten* has been given. This is almost entirely composed of insoluble albuminoids. It is the gluten of wheat flour that makes it so pre-eminently suitable for bread making; although barley is rich in total albumenoids this body is almost absent; consequently, instead of an elastic spongy bread, barley flour produces a heavy sodden mass. Other things being equal, the higher the percentage of gluten the more valuable is a wheat or flour. While the gluten is so much prized, the soluble albumenoids are the especial dread of both millers and bakers. Among these soluble nitrogenous bodies there is one found in the bran, to which the name of "cerealin" has been given; this possesses in a remarkable degree the property of acting on starch and converting it into dextrin and other soluble bodies. The germ of wheat is also particularly active in this respect. It is perfectly natural that this should be so, because the germ, being the future plant in embryo, requires to be able to act on and convert the starch as it requires it. It need scarcely be said that this action is objectionable to the miller; it is therefore prevented as far as possible in the flour by carefully separating both the bran and germ of the wheat in milling. The starch cells are more easily acted on when ruptured than when whole; consequently, the chemist would lay it down as an axiom of good milling—"remove all your bran and avoid crushing the starch cells;" for varieties of wheat capable of being manipulated by rollers that seems the method of working most likely to be successful.

Let us compare for a moment the quantities of the various constituents of different kinds of wheat. The water is tolerably constant, but it may be taken as a general rule that wheats having a high percentage of water have the ratio or proportion of insoluble to soluble albumenoids low. Studying the columns headed albuminoids we find that those wheats which are considered to be of superior quality have a high proportion of insoluble to soluble albuminoids. One of the most instructive comparisons is that between the same variety of wheat, the "Poulard Bleu," on a wet and dry year. The second sample naturally contains less moisture; the soluble albumenoids are lower, so also are the gum and sugar; the insoluble albumenoids are, on the other hand, much higher. Such a wheat will produce a stronger flour and much whiter bread. Comparing together the three last analyses, by the same chemist, we find that the flour contains less albumenoids than the wheat, but not much, while the starch is far higher. The bran removes some albumenoids, but especially contains the cellulose, or what may be termed the "woody fibre" of the grain. The vexed question of the relative nutritive values of whole meal and dressed flour may be here referred to. The advocates of the use of whole meal bread point to the greater amount of nitrogenous or flesh-forming materials it contains; that amount is, however, only the difference between 11·0 and 10 5 per cent., while the quantity of starch—also a most important food stuff—increases by 5 per cent. The ash is also diminished, and this, it should be remembered, represents the phosphates and other inorganic salts supplied to the body by the bread. The importance of this diminution is, however, very little, because these substances are always supplied in quantities, far more than necessary, by white bread and other ordinary articles of diet; this is proved by their presence in the waste secretions of the body. The great difference caused by the separation of bran is the removal of the cellulose, and this substance, it should be remembered, has just the same nutritive value as sawdust. I do not say, be it noticed, that bran has only the same nutritive value as sawdust. It is often urged that whole meal is the only natural form of flour; I am afraid that the word *natural* is here a platitude which may mean anything or nothing. The wheat berry is *naturally* that portion of the plant designed to propagate the species; its every condition is such that it may be compared to a charged shell with fuse attached; the slightest encouragement in the way of damp and warmth causes the germ to attack the other portions of the seed vigorously; this is an admirable arrangement for the reproduction of wheat, but it does not answer when we wish to keep the nutritive portions of the meal in a stable condition for our own consumption. In the whole meal the germ and active converting agents of the grain are still present, and although their plant-producing power is destroyed they are still active inasmuch as that they can still act and decompose the starch, &c., of the grain. For this reason it becomes so necessary to remove the germ and the bran as completely as possible.

Having reviewed the chemical nature of flour, I purpose next tracing the production of a loaf, and will endeavor to indicate what, according to my idea, should be the aim of the baker. First of all there is the bake-house; I cannot urge too strongly that this most important building should not be below the ground floor. In many existing baking establishments this may be impracticable; such being the case, let every effort be made to see that there is ample ventilation with pure fresh air. The drainage must be perfect, and by an efficient system of trapping all possibility of the entrance of sewer gas must be prevented. All corners, crevices, and hiding places of dust must be sternly prohibited. A plenty of light should be obtained; there is nothing like it for preventing an accumulation of dirt. The walls should be frequently whitewashed, or still better, faced with white glazed porcelain tiles. The troughs, dough boards, and other utensils should be "clean enough to eat from," to which purpose it must never be forgotten that they are actually put. Concerning ovens, my prejudices are strongly in favor of those that are externally fired; in either case, whether internally or externally heated, I would have the stokehole out of the bake-house; no coaldust or ashes should find their way there. With the bake-house in good order and well-conditioned, let us commence the production of our loaf. The flour will be let in the proper quantity from the floor above through a "shoot" into a kneading machine, where it is mixed with the requisite quantity of yeast and water in order to make the "sponge." The portion of flour used for this purpose should be of high quality, well cleaned from bran, and containing a high percentage of elastic gluten. In all mixing and kneading the work should be done without contact with the hands. Formerly it was necessary that all dough should be mixed by a process of turning over and over with the hands and arms of the workmen. With every effort to be cleanly it is impossible to conduct this operation without leaving behind in the bread *epithelium* or the dead outer cells of the skin which are continually being shed. There is in addition the copious perspiration necessary produced during such hard work, and which from the position of the workmen frequently finds its way into the kneading trough. There are, fortunately, now in the market machines simple in their action and not liable to get out of repair, which do this work thoroughly. The whole of the dough required for a day's baking of bread in a large business may be thus kneaded in a very few minutes. The sponge when made is set aside in troughs for a time varying from two to nine hours, at the end of which period its bulk will have enormously increased.

Let us next consider what the changes are that go on during this time. The tepid water used for making the sponge will have caused the soluble albuminoids in the flour to commence their action on the starch, thereby converting it into dextrin and maltose. The temperature should be kept as low as possible, because with its increase the rate of production of these compounds is quickened. Further, the higher the temperature the greater is the quantity of dextrin formed; this body is particularly objectionable, because it produces very highly-coloured decomposition products when the bread is heated in the oven. But another and more important change is that resulting from the action of the yeast. This substance, when viewed under the microscope, is seen to consist of a number of round or slightly oval (ovoid) cells; these cells are really plants of an extremely small and elementary description. They are, in good yeast, alive and, on being sown in what may be called suitable soil, thrive and multiply with extreme rapidity. When placed either in wort or dough and kept at a temperature between 85° and 90° F. this growth goes on, and is accompanied by a splitting up of the malt sugar (maltose) into carbon dioxide gas (carbonic acid gas) and alcohol. They also attack the albuminoids and assimilate some of the nitrogenous matter. Changes thus produced by living agents are classed together under the name of *fermentation*. The gas thus evolved is retained in the sponge by the elastic gluton, and gives it its characteristic vesicular structure. And here I may say something about bread turning sour. The particular living being, known as the yeast plant, is but one of many similar organisms. Others, during their growth and reproduction, yield acid and other characteristic products. It is therefore very necessary that pure yeast is employed, otherwise acid fermentation may go on, and thus produce sour bread. Yeast may be bad through impurities of this nature, or the yeast cells may be dead or old and feeble. The larger the quantity of soluble albuminoids in the flour the greater is the tendency of the dough to undergo these acid fermentations. Different bakers using different kinds of flour will suit their method of sponging to the flour; those who use damp flours with a high percentage of soluble albuminoids will prefer a quick yeast, and will shorten the time of sponging, as they thus lessen the quantity of dextrine and maltose produced. With such flours, and working with a slow yeast like English brewers' yeast, the use of "fruit" is often resorted to. This, as you all know, consists of well-boiled potatoes; its advantage is that the starch of the potato is made up of larger cells, the walls of these break down more easily, and so the conversion of starch into carbon dioxide gas and alcohol is the more rapid. Remembering that with properly selected flours it is possible to set up fermentation efficiently without the addition of foreign matters to the flour, it is a question for consideration whether under such circumstances the use of *fruit* is or is not beneficial. It undoubtedly accelerates fermentation, and that with damp flours containing much soluble albuminoids is an advantage. On the other hand the employment of potatoes in this manner, or leaven as the French do from a preceding batch, increases the risk of introducing acid ferments. This point, in common with many others in bread making, is one on which much yet remains to be done. Dr. Graham's proposal that dextrose (a sugar artificially prepared from rice) be used seems to me a suggestion well worthy of being made the subject of careful experiment.

On the sponge having risen sufficiently it should be returned to the kneading machine; then mixed with salt and the requisite quantity of water and flour to make a dough of the proper consistency. The flour here used need not necessarily be of such high quality; as, during the remainder of the time elapsing before the dough is placed in the oven,

(CONTINUED ON PAGE 28).

# UNITED STATES MILLER.

E. HARRISON CAWKER, EDITOR.

PUBLISHED MONTHLY.

OFFICE, Nos. 116 & 118 GRAND AVENUE, MILWAUKEE, WIS.

SUBSCRIPTION PRICE.—PER YEAR, IN ADVANCE.

To American subscribers, postage prepaid.....$1 00
To Canadian subscribers, postage prepaid..... 1 00
Foreign Subscriptions..... 1 50

All Drafts and Post-Office Money Orders must be made payable to E. Harrison Cawker.

Bills for advertising will be sent monthly, unless otherwise agreed upon,

For estimates for advertising, address the UNITED STATES MILLER.

[Entered at the Post Office at Milwaukee, Wis., as second class matter.]

MILWAUKEE, DECEMBER, 1883


*We respectfully request our readers when they write to persons or firms advertising in this paper, to mention that their advertisement was seen in the* UNITED STATES MILLER. *You will thereby oblige not only this paper, but the advertisers.*

## 1884.

### FLOUR MILL DIRECTORY.

We are now hard at work preparing CAWKER'S AMERICAN FLOUR MILL AND MILL FURNISHERS' DIRECTORY of the United States and Canada for publication and expect to have it ready for delivery on or about January 1, 1884. Flour mill owners can very materially assist us and make this work of greater value to the trade by writing to us and giving the correct name and style of their firm, with post-office address, and also the capacity of their mill in barrels per day of 24 hours, and also the kind of power used—whether water or steam. We shall spare no pains to make this directory better and more complete than any former edition. Our 1882 edition met with great praise from all who used it, and we think our 1884 edition will give still greater satisfaction. It is to the interest of every mill-owner to be correctly represented in this work. It will cost you nothing but a few moments writing and the price of a stamp which now is only two cents. The directory is used by mill-furnishers, commission merchants, flour exporters and importers, dealers in machinery and supplies, and by millers, shipping agents, insurance agents, etc., as a work of reference. It has been found to be indispensable to the transaction of business in the trade.

Address all communications to

E. HARRISON CAWKER,
Nos. 116 & 118 Grand Ave.,
Milwaukee, Wis.

---

JOHN K. MOORE of Cherokee County, Ga., writes us that his county is a most desirable location for manufactories of almost any kind. Water power is cheap and abundant. A cotton mill is especially desired now.

---

STILL they come! During the month of October 48,865 immigrants arrived in the United States. Of these 8,176 were from the Dominion of Canada. During the ten months ending October 31, 1883, 501,037 immigrants arrived, against 668,015 during the corresponding period in 1882.

---

EXHIBITORS of milling machinery at the late Louisville Exposition think that the pecuniary results to them will be anything but satisfactory. The attendance of millers was very small, and the information they obtained was theoretical—they went away but little wiser than when they came. All agree that from a milling point of view the Louisville Exposition was a failure.

---

FROM the October report of Hon. Joseph Nimmo, Chief of the U. S. Bureau of Statistics, we glean the following: During October 1883 we exported $14,651,530, worth of breadstuffs, against $15,362,682 during October 1882.

During October 1883 we exported 6,587,728 bushels of wheat, worth $6,927,229, and 771,286 barrels of flour, worth $4,392,189.

The total value of exports of breadstuffs for the ten months ending October 31, 1883, was $145,082,034, against $150,300,581 during the the same months in 1882.

---

OUR old friend Geo. G. Smith, the well known millwright, formerly of Milwaukee, but now a California mill-builder, with office and shops at 109 and 111 Mission st., San Francisco, writes us under date of Nov. 1, that he has just completed the Santa Clara Roller Mill. It has a capacity of 250 barrels per 24 hours. It ran splendidly from the start, and not a spout had to be changed. It is making first-class flour, averaging a barrel to 266 lbs. of wheat, which is as well as can be done with California wheat. Gray's rolls are used. The mill-furnishing business is reported dull just now on the Pacific coast, but the prospects are excellent.

---

The annual average rye crops of Denmark, France, German Empire, United Kingdom, Italy, Austria, Hungary, Russia, Holland, Belgium, Sweden and Norway, as reported by the Vienna Congress for the last seven years preceding 1883, has been 1,052,986,345 bushels. This year the estimate is but 858,249,370 bushels. Russia, which usually grows nearly 700,000,000 bushels, this year is down for only 473,284,495 bushels. Belgium and Denmark are the only countries that seem to have kept up to their usual standard of production. Spain produces annually 30,000,000 to 35,908,000 bushels of rye; Portugal, 12,500,000 to 15,313,721; Greece, 160,000 to 162,000 bushels; and Roumania, 3,500,000 to 4,212,293 bushels.

---

The Milwaukee crop authority, Mr. Tallmage, estimates the total yield of corn this past season at 1,621,100,000 bushels, the largest crop of Indian corn, with one exception ever harvested—and this in spite of the ravages of frost. The reports from Wisconsin, Michigan and Minnesota put the injured corn at 50 per cent., the damage in some instances—in Wisconsin—being total. Mr. Tallmadge's estimate of the yield by States is:

| | | | |
|---|---|---|---|
| Maine | 800,000 | NewHampshire | 800,000 |
| Vermont | 1,800,000 | Massachusetts | 1,200,000 |
| Rhode Island | 300,000 | Connecticut | 1,200,000 |
| New York | 20,000,000 | New Jersey | 10,000,000 |
| Pennsylvania | 40,000,000 | Delaware | 4,000 000 |
| Maryland | 16 000 000 | Virginia | 35,000,000 |
| North Carolina | 35,000,000 | South Carolina | 15,000,000 |
| Georgia | 30,000,000 | Florida | 4.000,000 |
| Alabama | 32,000,000 | Mississippi | 30,000,000 |
| Louisiana | 15,000,000 | Texas | 67,000.000 |
| Arkansas | 34,000,000 | Tennessee | 75,000,000 |
| West Virginia | 15,000,000 | Kentucky | 75 000,000 |
| Ohio | 70,000,000 | Michigan | 25,000,000 |
| Indiana | 100,000,000 | Illinois | 170,000.000 |
| Wisconsin | 25,000,000 | Minnesota | 20.000,000 |
| Iowa | 165,000,000 | Missouri | 190,000,000 |
| Kansas | 190,000,000 | Nebraska | 90,000,000 |
| California | 3,000,000 | Dakota | 6,000,000 |
| Other States and Territories | | | 5,000,000 |
| Total | | | 1,621,100,000 |

---

The Christmas number of HARPER'S MAGAZINE promises to bring together the most remarkable gathering of authors and artists ever grouped under one (paper) roof. The former include, among others, George William Curtis, John G. Whittier, Miss Thackeray (Mrs. Ritchie), E. P. Roe, William Black, W. D. Howells, George H. Houghton, Austin Dobson, Charles Reade, Edward Everett Hale and Charles Dudley Warner; while among the artists are E. A. Abbey, James C. Beard, George H. Boughton, F. S. Church, Frederic Dielman, Alfred Fredricks, A. B. Frost, W. Hamilton Gibson, Alfred Parsons, Howard Pyle, C. S. Reinhart, W. L. Shepherd and Jessie Curtis Shepherd. There will also be illustrations from paintings by G.F. Watts, R. A., and from unpublished sketches by Thackeray, Frederick Walker and Dante Gabriel Rossetti. The number will include four plate-paper pages in addition to the usual size of the Magazine.

---

### GAMBLING IN GRAIN, ETC.

If the gambling in grain, etc., of the present time, was confined to the well to do or wealthy class, the deep moral injury on society at large, would not be so great as it is. Its terribly corrupting influence on young men, even mere boys, cannot be too severely denounced. We frequently find in the columns of newspapers, apparently, a delight manifested in the descriptions of grain and stock gambling. Thousands of young men are growing up in the belief that only the poorest of our own classes, or ignorant foreigners, need to labor to live. It was Horace Greeley who said and we wish every young man would take the saying to heart;

"The darkest day in any man's earthly existence is that wherein he first fancies that there is some easier way of gaining a dollar than by squarely earning it. * * * He has lost the clew to his way through this mortal labyrinth, and must henceforth wander as chance may dictate."

A recent number of the *British Mercantile Gazette* forcibly alludes to the increase of "gambling" in Great Britain:

"Outsiders have but the faintest possible idea of the ruin caused by the abuse of speculation. In the old days at Crockford's gambling hell, play was remarkably high, and public opinion abolished the nuisance. But all the mischief of the hells of St. James' was child's play compared with a fort-night's hazard in Capel Court. For instance, there is in existence barely £1,800,000 worth of Brighton A, yet it frequently happens that over £50,000,000 of differences are cleared on a busy settling day. This, of course, means that wagers on the rise or fall, under the false pretence of buying or selling stock, have reached a yet more formidable amount. Again, Mexican ordinary figures in the share-list as about £1,250,000 stock, yet at the last monthly settlement 25,000,000 or 30,000,000 sterling had to be adjusted. Our forefathers who fulminated against the 'infamous practice of stock jobbing' would turn pale at the modern refinements of speculative art." Of all the bad influences at work, destroying the moral foundation of society, nothing equals the propensity to gamble, or as Greeley said, the fancy for "gaining a dollar without squarely earning it." Not very long since the following quotation was found in an alley on a slip of paper, a letter head in fact still in existence;

"There is a gulf where thousands fell,
There all the bold adventurers came;
A narrow sound though deep as hell,
'Change alley is the dreadful name."

Had some Englishman, who had read Swift, from whose writings the verse is taken, sunk his all, and finding himself destitute copied the verse and dropped it, as a warning to others? Or, was it that Briton who on his return to England was asked: "What is a "put" and a "call," replied, "Oh you "put" your money in a broker's hand and the moment your back is turned he "calls" you a d——d fool."

Poets in all countries have penned verses, to the folly and immorality, of gambling in grain and stock. We quote a couple or rather the original, and its translation. The first victim was evidently a Frenchman, and he exclaims:

"Lunde, j' achetais des actions;
Mardi, j' avais des millions;
Mercredi, j' etablais mon menage,
Jeudi, je fis mon equipage.
Le Vendredi je fus au bal;
Et Samedi, a l' hopital."

The Americans understanding French, and apparently having a similar experience, thus translates the above with all the "vim" of American expression:

"Monday. I dabbled in stock operations;
Tuesday. owned millions by all calculations;
Wednesday, my Fith Avenue palace began;
Thursday, I drove out a spanking bay span;
Friday, I gave a magnificent ball;
And Saturday *'smashed'* with nothing at all."

This is the end of chapter one, on gambling in grain etc.—More anon.

---

[For the UNITED STATES MILLER, from our Special Correspondent.]

### LOUISVILLE AS A MILLING POINT.

EDITOR UNITED STATES MILLER.—The beautiful city of Louisville, Ky., ought to have a goodly number of first-class flouring mills. She has capital and men with the proper business experience; is within easy reach of rich wheat-fields North and South; fuel is cheap; lines of transportation stretch out in every direction which would facilitate the importation and distribution of the products of several mills and yet there is no mill there that can properly be considered *first class*.

Properly located mills under good management, are certain of success. The dullness which exists in the North and Northwest is due principally to the high prices of wheat and high freight rates which make it disadvantageous to ship mill-products long distances. The trade of the South demands a higher grade of flour than that which is being generally manufactured there at the present time and there is no location better adapted to supplying this demand than Louisville, and as a distributing point for the sale of manufactured products, it has decided advantages. They can sell direct, free from the heavy expense of commission to the merchants through the entire South. They have great advantages in the matter of transportation with their extensive river facilities as well as railroads centering and diverging at this point, insuring cheap freight from sharp competition, thus securing at all times cheap fuel and low freight for their raw materials and manufactured products. This condition of affairs is a suggestive one. It shows conclusively that good mills located in Louisville can make flour cheaper than northern rivals. The true policy of Louisville mills would be for the present at least to confine themselves to the manufacture of a strictly first-class straight flour deducting about 20 per cent. which would sell as a good Extra. I think that flours of percentages above mentioned would meet with great favor and sell at remunerative prices if proper machinery and skill be used in producing them. Louisville combines the advantages of both sections of the country, and it would be impossible to put forward a more inviting investment. The only trouble heretofore has been to induce those that are at present engaged there in the manufacture of flour under the old system to take hold of it. Certainly, the time is now ripe for pushing this to a conclusion and I believe the day is not far distant when Louisville will have a number of the finest equipped mills in the winter wheat states. She has all the natural requirements and if the milling fraternity there, fails to take advantage of them outsiders will no doubt step in and do it for them. T.

---

### A 200-BARREL ROLLER MILL WANTED.

The citizens of the beautiful little city of Carrollton, Ill., are anxious to have a company or firm erect a first-class 200-barrel roller mill there. A prominent grain dealer and one of the substantial citizens of the place offers to furnish a third of the necessary capital needed, and other citizens would probably take sufficient stock to make up one-half. Carrollton is located in as fine a farming country as can be found, and in the midst of the Illinois winter wheat belt. It has two railroads. There is now but one mill there, and that is said to be rather old-fashioned. Most of the flour used by the citizens is brought from other places by the railroads. Millers seeking a desirable location for investment will do well to investigate. They may address the Carrollton Manufacturing Co., Carrollton, Ill., for further particulars.

---

### THE BRAN PACKER MATTER.

The following circular has recently been issued from the office of the Secretary of the Millers' National Association, which will no doubt prove interesting to our many readers.

MILWAUKEE, WIS., Nov. 19th, 1883.

DEAR SIR:—On the 19th of February last the following circular to the inventors of the country was issued from this office, and by the generous courtesy of the press—both technical and daily-it has received a very extended circulation and the correspondence in connection therewith indicates the probable invention of a machine that will fill all the requirements named.

CIRCULAR—"By virtue of a resolution adopted at the Delegate Convention MILLERS' NATIONAL ASSOCIATION, in Cleveland, January, 31st ult., the Sub-Executive Committee are instructed to offer a cash premium of $1000 for the invention and production of the best practical machine that will enable mills of ordinary capacity to compress BRAN economically into a suitable, cheap and safe package for export, at a saving of at least *five cents per hundred pounds* in the process, package and freight, over the methods now in general use.

REQUIREMENTS.—*First.* A machine that will compress one hundred pounds of ordinary Bran into a package not exceeding (15) inches square, or two hundred pounds in the same ratio.

*Second.* That will, with the aid of an attendant and a reasonable amount of power, prepare for shipment one ton or more per hour.

*Third.* The inventor or owner of the successful machine must stipulate to sell it at a reasonable price, (to be agreed upon between the Executive Committee and himself) *to all members of the Association.*

*Fourth.* The offer to remain open one year, the committee to be at liberty to reject all devices competing for this premium, that do not come up to the requirements of the trade.

SUGGESTIONS.—*First.* Other results being equal, the machine producing a package with the best form for close "stowage," will have the preference.

*Second.* The package should be compressed in such a manner that when the covering is removed the Bran will assume its ordinary condition without manipulation.

*Third.* No machine, or process, requiring the addition to Bran of moisture, or any foreign substance, will be entertained.

*Fourth.* It is desired that parties building, or with machines in model, intending to compete for the premium will report progress at an early date."

At a late meeting of the Sub-Executive Committee, the Secretary was instructed to furnish inventors at an early date, with such other suggestions and information, in reference to machines, and their competition, as would enable them to make their arrangements within the time specified in the offer, and for a test of their invention, that would be most satisfactory to themselves and the Committee.

I would therefore suggest for your information and guidance the following

MEMORANDA.—*First.* The offer of $1000 expires February 1st, 1884. All machines intended for competition must be ready for trial previous to that date.

*Second.* No award will be made by the Committee prior to February 1st, 1884.

*Third.* The Committee are to be the sole arbitrators and decide upon all matters pertaining to the practicability, economy and usefulness of competing machines.

*Fourth.* No award will be made unless a machine is produced, that will fully and practically meet the requirements of the offer.

*Fifth.* It is not expected, nor will it be necessary, for competing machines to be tested at the same time or place, but all will be tested upon the same or similar material.

*Sixth.* It will be the aim of the Committee to arrange for the testing of the machines with as little expense and trouble to inventors as possible, consistent with thoroughness and impartiality.

*Seventh.* Every machine should be so constructed as to be adjustable, in order to compress packages of various sizes and weights, viz.: 100, 112, 140, 200 and 224 pounds.

*Eighth.* Experience has shown that Jute Burlap sacking is the cheapest and most desirable covering for packages.

*Ninth.* The proper shape for a package to contain 140 pounds of Bran, when compressed, will be, say 9x18x28, and other sizes about the same proportions, uniformity of size and shape being desirable for convenience of handling and stowage.

*Tenth.* The Committee reserve the right to extend the time for conferring the premium, in case none of the machines are considered sufficiently meritorious or developed to meet the purposes required.

Respectfully, F. H. SEAMANS, *Sec'y.*

### THE "PRESIDENT" MILLS AND ELEVATOR, BETHALTO, ILL.

One of the finest wheat regions on the continent is the winter wheat section of which St. Louis is the natural center. A soil of almost inexhaustable fertility has for a generation with few failures, produced magnificent wheat, which made the name of "St. Louis Flour" a synonym everywhere for the best. It was principally for this reason that the millers of the St. Louis region did not, at first, adopt improved milling methods and machinery with the avidity displayed by those in other parts of the country. No sooner had it become apparent, however, that gradual reduction was an actual step in advance, and its results began to show on the markets, than an epoch of overhauling and building commenced in that region which is still going on. Not only have old mills been refitted to the new systems, but new mills have been built, which, in the excellence and completeness of their equipment, are in the very front rank of the mills of the land. Several of these mills have been illustrated and described in these columns, and on this page we give an excellent engraving of one of the latest built mills of that section, as well as one of the best in the entire country: the "President" Mills and Elevator, at Bethalto, Ill., owned by one of St. Louis' best known and enterprising millers, Mr. John W. Kauffman. As the intention both of its owner and builders, Messrs. Edw. P. Allis & Co., was to make this mill unrivaled, the following brief description will doubtless be perused with interest.

The building is of brick, with stone foundation, is 62 by 92 feet on the ground, and is built throughout in the most substantial and durable manner. It is four stories high above the basement, with flat tar and gravel roof. The engine and boiler rooms adjoin the main building on the north. This addition is 60 feet long, 36 feet wide, and one story high. The engine room is 17 feet wide and is separated from the boiler room by a brick partition wall. The stack is of brick, is 100 feet high, and 4 feet square in the clear, inside.

East of the mill, with a clear space of 20 feet between, is the large elevator, 40 by 92 feet resting on solid foundation and built after the most approved methods of elevator construction. The elevator building contains the cleaning machinery, and affords storage capacity for about 100,000 bushels. There are 21 wheat bins, and a space 20 feet square in the northeast corner for cleaning machinery. The height of this building, from basement walls to the eaves, is 63 feet, and the roof is surmounted by a cupola 12 feet high and 20 feet wide. The south end of the cupola is 6 feet higher than the rest, to admit the head of the receiving elevator. The mill office is located in the southwest corner of the elevator building on the first floor. The elevator building will be covered with corrugated iron.

South of the main mill building, and separated from it by the mill switch, is a warehouse one story high, 62 feet wide, and 120 feet long. The main tracks of the Indianapolis & St. Louis R. R. pass the property on the south, and the mill and elevator have ample receiving and shipping facilities. Wheat is also received direct from farmers' teams at the north end of the elevator. The wheat is weighed on track scales, and can be taken care of by the receiving elevator at the rate of 4,000 bushels per hour. The elevator contains the most approved facilities for handling the grain, and neither pains nor money have been spared to make it as complete as possible in every respect.

Between the mill and elevator, near the south end, at the level of the top of the bins, the mill and the elevator are connected by a roofed truss bridge, carrying conveyors for taking the bran and shorts from the mill to their respective bins, each having a capacity of 72 tons, located on either side of the receiving elevator. A similar bridge at the north end carries the conveyors for taking the clean wheat and screenings from the elevator to the mill. The power for operating the elevator is taken by an underground shaft from the line shaft in the basement of the mill. The cleaning machinery consists of two large Richmond separators, a Richmond screenings separator, a Richmond brush, and a Morgan smutter. Three large dust-catchers take the air from the cleaning machinery.

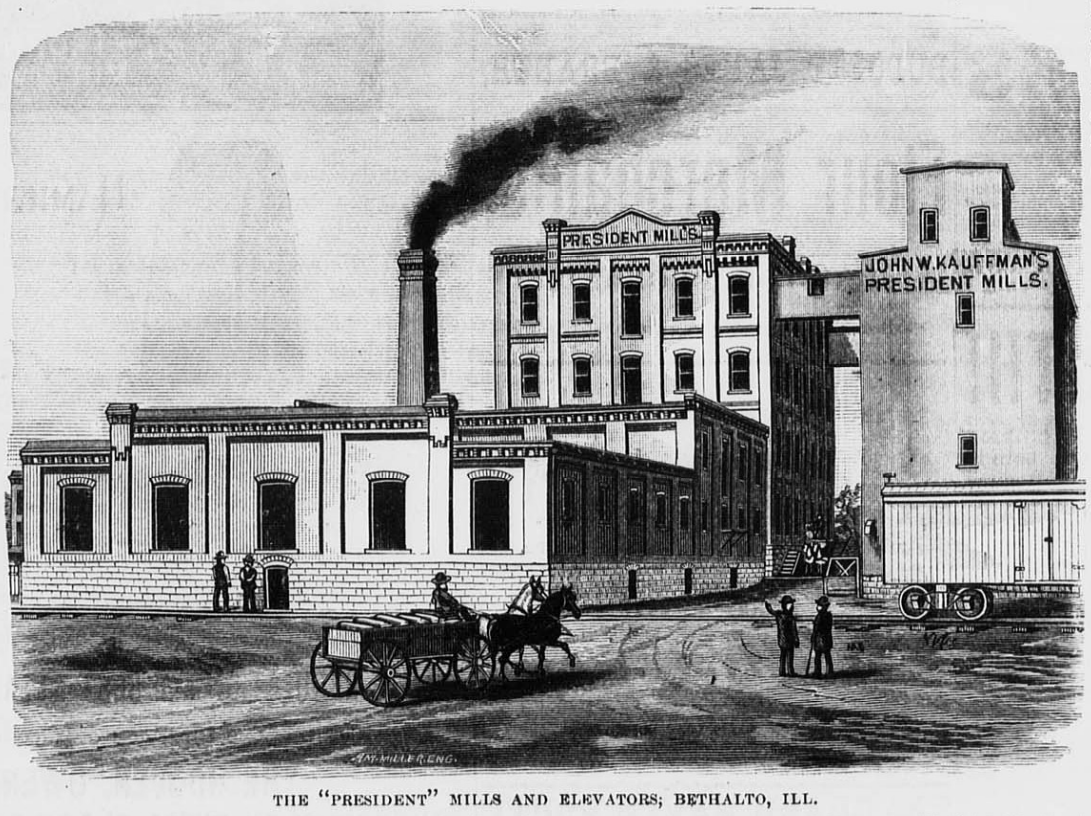
The basement of the mill proper contains the main line shaft, roller line shafts, gearing and pulleys, and the conveyors underneath the rolls. These conveyors are aspirated, and the dust taken out of the air from them by four large dust-catchers also located in the basement. Twenty-seven elevators reach into the basement.

On the grinding floor are thirteen double roller mills, corrugated for the breaks, two seive reduction machines—each containing two pairs 9x18 corrugated rolls—for reducing the screenings; thirteen double 9x18 porcelain roller mills, and eleven double smooth iron roller mills. All these machines are of the well known Gray's Noiseless Belt patent. On this floor are also six flour packers and a large iron frame tightener for the main upright belt, with pulley 18 inches in diameter and 28 inches face, with a 6-foot range of adjustment.

On the first and second bolting floors are six of Gray's Patent Purifiers with brushes and dust-catchers for the coarse middlings; ten No. 2 Smith Purifiers with dust-catchers; four 10 reel bolting chests with reels 16 feet by 32 inches; one 4-reel chest with same size of reels, and seven of Gray's Centrifugal Reels.

The attic or top story contains five 2-reel scalping chests, reels 12 feet by 32 inches; three Gray's Centrifugal Reels; one large Richmond horizontal bran duster; one Meyer automatic bran scale; one Meyer automatic feed scale; and the elevator and bolting chest, line shafts and gearing. The mill contains fifty elevators.

The mill has a working capacity of 800 barrels every twenty-four hours, though the building is large enough to contain the machinery necessary to increase its capacity 400 to 500 barrels more, and this addition will doubtless shortly be made. Everything appertaining to the mill is of the very best that the long experience of the owner and the best mill building talent of this country could devise, and the mill is claimed to be the most complete and perfect mill of its capacity to be found in America, or in the world.




THE "PRESIDENT" MILLS AND ELEVATORS; BETHALTO, ILL.

The mill was designed by W. D. Gray, the well known milling engineer, and was furnished and built throughout by Messrs. Edw. P. Allis & Co., the proprietors of the Reliance Works Milwaukee, Wis. It is located at Bethalto, Ill., and occupies the site of the mill which Messrs. Allis & Co., rebuilt for Mr. Kauffman last year, and which was unfortunately destroyed by fire about six weeks after its completion. The mill is owned by Jno. W. Kauffman, of St. Louis, Mo., owner also of the "Park Mills"(600 barrels capacity) in that city. Both mills are in charge of Mr. David Simpson, a miller of acknowledged skill and ability. The business management of the Bethalto plant is intrusted to Mr. John Wiedmer, one of Mr. Kauffman's most trusted lieutenants.

---

### INVENTIONS AND SCIENTIFIC PROGRESS.

The nineteenth century is rich in scientific research. Scientific information is widely diffused, and scientific associations are rapidly increasing. Inventors quickly turn every discovery to profit. It is only five years since the first whisper of the telephone was heard, and now it is in common use.

American inventors are ahead of all other nations, both in the number and the value of their inventions.

One cause of this is the Patent Law of 1790, which has, without question, done much to stimulate inventions. A patent can be obtained in this country for only thirty dollars. In England, it costs from $800 to $1,000. In fact, we may reasonably look upon our patent office as a public educator—for inventors are men of thought; the mechanics of America are essentially a reading, thinking people, studying problems of utility. Is it too much to say that the great reason for the difference in intelligence between American and European mechanics is that the former is spurred on to thought by the hope of a reward which the laws of Europe have placed beyond the power of her working men to attain?

A boot and shoe manufacturer in Switzerland not only purchased his machinery in Massachusetts, but was then compelled to send for American workmen. Both Russia and Australia send to America for locomotives.

Some are looking to China as the great manufacturing centre of the future; but they will doubtless find that a nation which has remained passive for 4,000 years will lack the vigor and push necessary to invent.

It is a curious fact that only among a free people can mechanical invention make progress. England was the freest nation of any during the last century, and she made the most progress. In this century, we have far outstripped her. France, not a whit behind England in education, made no inventions until after the French Revolution and the establishment of a patent law in 1791. Germany gives the world patient, painstaking scientists and philosophers; but, in spite of her fine school system, no inventors, for her government is a military one. Austrians, Russians, Spaniards, etc., are none of them inventors.

During the next fifty years the advance in mechanical inventions will doubtless far exceed that of the last fifty years. As yet, we know very little of what may be called the "energy of nature."

Probably the next important application of it will be the perfecting of the electric light, so that it may be brought into daily use. To Professor Wheaton, of England, belongs the first honor of this discovery, as he experimented with it in 1840. In 1859, Professor Farmer, then resident in Salem, Massachusetts, now in the employ of the government at the Torpedo Station, Newport, lighted his room by electricity, but the cost of the zinc used in the galvanic battery rendered the light much more expensive than that of gas.

Professor Edison has now removed to New York City, where lighting by electricity is becoming fully tested under his careful supervision.

It has already been demonstrated that an electric light can be produced which will be equal to 1,000 feet of gas costing $2.50 at an expense of only 50 cents. Added to the powerful motive of economy is the fact that the electric light is steady, does not flicker, does not heat or vitiate the atmosphere, has no odor, can be instantly lighted without the use of matches, and is of superior brilliancy.

Not only will this light be used in the cities, but small manufacturing towns, with water power, can also be benefitted, by the simple erection of a water-wheel and generator; so that Lowell, Manchester and Lawrence may yet be lighted by water from the Merrimac river.

Electricity will also doubtless provide us with elevators; thus doing away with the going up and down the stairs that are so destructive to health and life in a city, and placing what is now the convenience only of hotels and large buildings in every private house.

And this same powerful agent also holds before us in the future another bright promise. The open wood fire has given place to the close stove, dry furnace heat, or ill regulated steam; but we may hope in the near future to have our houses warmed by electricity; then gas, now expensive, as it can only be produced from the best quality of coal, (in fact, only 6 per cent. is used, the remaining 94 per cent. being wasted,) may be manufactured for cooking purposes out of the poorer quality, and ornamental heating fixtures may be found in parlor, bed-room and kitchen which will not fill a room with dust, not vitiate the atmosphere, as the gas will be burned in a closed radiator, the fumes escaping up the chimney.

Baltimore, even now, produces such a fuel gas, at a cost of not more than fifty cents per thousand feet.

Science has lately turned her attention to what men call "important methods of warfare." The plates of iron gun-boats have been thickened to resist cannon balls; but they, in their turn, have received attention, and it is now conceded that no iron-clad can be built that will withstand the ball sent forth from a Krupp cannon. If war should break out between England and America, a ship might be stationed seven miles from Boston, and yet toss her shot and shell fairly into the city.

The torpedo boat, with dynamite for ammunition, can speed through the water at the rate of half a mile in sixty seconds. What, then, is the future outlook for effectual warfare that will test the strength of nations? We may thank science and invention that they are forcing nations to settle their difficulties in some other way than by the life blood of their people.

Every German and Frenchman is compelled to spend some of the best years of his life in the army, and the cost of standing armies is an immense drain upon the finances of any nation. Europe keeps 2,000,000 men in the field at a cost of $1,000,000,000 per annum. In this respect the United States is doing well. Her population nearly equals that of any country in Europe, and her area vastly greater; yet her army and her navy are insignificant when compared with those of other nations; thus her people are at fullest liberty to devote their energies to progress and development.

There are 55,000,000 souls in America to-day. Ten years hence the number will be 70,000,000. At the close of the century, 90,000,000. What will it be 100 years hence? What 1,000 years?

The new civilization, while developing the forces of nature, recognizes, as no past age has done, the truth that "life is more than meat, and the body than raiment."

In no other age has man, as an intellectual and moral being, been held at so high a value as at the present time.

It is this recognition of the worth of human beings that arches all the future with hope and light. Men are no longer mere food for powder, the many created to do the bidding of the few. The new civilization recognizes not only the right of every man to make the most of himself, but regards it as the duty of society to aid him.

Amid the smoke and flame of Gettysburg, America announced to the wondering nations that henceforth we were to be, not a confederacy, but a nation, one and indivisible; that men, irrespective of lineage, race, or previous condition, through all coming time, were to have all the rights and opportunities of citizenship.

Our growth in wealth is fabulous. Our first savings bank was established in 1816. In 1830, about $6,000,000 were on deposit; in 1880, $1,000,000,000.

Contemplate our railroads, manufactories, mines and cities. We stand amazed. The world has never witnessed such a spectacle. Men start in life without a dollar, and in fifty years have millions.

But you say "Rich men are growing richer; the poor, poorer." It is true that the rich are growing richer, but it is not true that the poor are growing poorer. The poor man keeps step with the rich in the enjoyment of our numberless improvements. His house, his dress, food, newspapers, library, lectures, etc., etc., are the great blessings of life, and he enjoys them in common with the rich man. The poor man of to-day is vastly better off than the poor man of fifty years ago.

The Irish ride to the cemetery, when one of their number dies, in coaches far more

luxurious than the best at the demand of England's great queen, Elizabeth.

At the beginning of this century there was probably not a bed in the world as comfortable as may now be purchased by two days wages of a hod-carrier. Carpenters and blacksmiths can spread their tables with luxuries which it was not possible for Queen Victoria to obtain when she ascended the throne. The fruits of all climes are to be found in our markets.

The new civilization has changed the world's estimate of men. In olden times kings and conquerers were idols. But to-day, we forget kings and lords, while the names of Stephenson, Fulton and Morse awaken more enthusiasm.

The use of coal began a great revolution. One hundred years ago, Great Britain consumed 6,000,000 tons in a year; now, 140,000,000 tons. It is the energy in the 200,000,000 tons of coal now used in the world every year that gives motion to the world's machinery. In 1788, Great Britain manufactured 68,000 tons of iron; in 1880, 7,000,000 tons. In 1851, Great Britain's product of steel was 61,000 tons; twenty-seven years later, 1,000,000 tons. Inconceivably vast areas of coal are still untouched. Europe has 3,500 square miles of it; Great Britain 5,400; North America 100,000 square miles. At the present rate of consumption, England will use up her coal in 1,000 years, and America will exhaust hers in some millions of years.—*Dio Lewis's Monthly.*

[From *The Miller*, London.]

## ENGLISH TECHNOLOGICAL MILLING EXAMINATION.

[Continued from November number.]

HONORS GRADE.—QUESTIONS.

1. Name in rotation, commencing at the exterior, the parts of a wheat corn.

2. Of the wheats named in question two of the Pass Grade which are better adapted for millstone grinding, and which for roller grinding?

3. Name the machines necessary for cleaning and preparing for grinding wheat in a mill intended to deal with every sort of foreign and English wheat.

4. What are the respective advantages of, and objections to, driving millstones by—(a) spur gear, (b) bevel gear, (c) pulleys and belts?

5. Specify in detail the parts of the driving and feeding apparatus of a pair of horizontal millstones (the upper stone running) from the neck inclusive upwards.

6. The leading types of roller mills are fitted either with pairs of rollers whose spindles are placed in the same horizontal plane, or as "three high" mills. State the various principles on which pressure is applied to the rollers in the former, and in the latter. Sketches may be used to illustrate your statement.

7. It is required to reduce wheat to flour, middlings and offals by rollers in the least number of breaks, you have the choice of rollers of nine inches and of eighteen inches diameter; which will you choose, and for what reasons?

8. It is required to reduce wheat to flour, middlings and offal, so as to make the least percentage of break flour, and the greatest percentage of middlings; describe the process you would adopt for breaking down the wheat and give a list of the machines you would employ.

9. A gradual reduction mill, is fitted up with six breaks. Give the number of flutings, per inch, for each roller mill. Would you use centrifugals or reels for scalping? Give the reason for your preference. State the material and the distinguishing number indicating the mesh of the material with which you would cover each scalping machine.

10. A reel is covered with No. 12, No. 13, and No. 14 silk; it is replaced by a centrifugal. What number of silk should be used to produce a corresponding quality of flour?

11. Given a quantity of the meal dressed through scalpers of the second, third and fourth break in a six-break reduction process. State how you would manipulate it so as to prepare the seminola for further reduction.

ANSWERS.

1. The wheat berry consists of three main parts: first the hull or husk; second the germ or embryo; and third the inner white flour kernel. The hull or husk consists of six distinct coatings or membranes, viz: 1, the epidermis, or cuticle; 2, the epicarp; 3, the edocarp; 4, the testa; 5, the tegumen; 6, the embryous membrane.

2. The following wheats are suitable for millstone grinding: Australian, Californian, Canadian white, Danzig, Rostock, American winter, American red winter, Red English, Rivetts and Nursery Wheats. The following are better adapted for roller milling: Chilian, Bombay red, Calcutta white, Persian, Azima, Saxonska, Polish, Odessa, Taganrog, Ghirka, No. 2 Minnesota, No. 2 Chicago spring.

3. The following machines are necessary and advantageous for cleaning and preparing wheat in a mill intended to deal with every sort of foreign and English wheat: 1, dusting reel; 2, aspirator or separator; 3, grading cylinders for grading the wheat; 4, cockle and oat-separating cylinders, with grooves corresponding to the two or three different grades into which the wheat has been divided; 5, smutters; 6, brushes; and 7, a good washing machine for Egyptian or similar dirty wheats. A damper should be arranged so as to damp very hard wheats if required, and automatic or ordinary magnets should be arranged so as to separate very metalic particles from the *small* streams passing from cockle and oat cylinders to smutters.

4. (a) Millstones driven by a spur gear can be arranged in a group of three, four, five, six or more pairs round one main spur driving wheel, thus requiring but a small number of bearings, and taking up but small space. In the case of mills driven by water power, not much *intermediate* gearing is required between water wheel and millstones for getting up the required speed, the large main wheel running but few revolutions. The runner stones can be raised or lowered without affecting the proper gearing of the teeth of the wheels, because of the relative position of the pitch-lines of driving and driven wheel not being altered by the adjustment of the stones. Spur gearing is, however, often liable to cause backlash in the wheels, especially if the motor is not very regular. The motion of the stones is therefore, in this case, seldom very even, and the condition of the grinding surfaces of the stones, and also that of the meal, is somewhat injuriously affected thereby.

(b) Bevel gear is specially adapted for the arrangement of millstones in one line, and for a higher speed of the main driving shaft, it is, therefore, more suitable for mills driven by steam power. It is less liable to suffer from back lash than spur gearing, the driving and driven wheel not differing so much in size and speed. The relative position of the pitch lines of the two wheels is, however, somewhat affected by the adjustment of the runner-stone, and this interferes somewhat with the regular motion of the stones. Both spur and bevel gear teeth, if wood and iron, as is usual, wear much, and as the wheels require re-cogging frequently, considerable repairing expenses are often thereby incured.

(c) Millstones driven by pulleys and belts generally have a nice even motion, they do not suffer from back lash, and if the belts are well looked after and not allowed to get too slack, they seldom give any trouble. The side pressure against the neck-bearing and the toe-step, caused by the tension of the belt, is, however, not inconsiderable, and causes these bearings to wear chiefly on that side. If, however, proper adjustments have been provided for taking up such wear, the spindle can easily be kept in a proper vertical position. If loose pulleys are arranged, any pair of stones in a row may be thrown in and out of gear without stoping the mill. In the case of spur and bevel gear the stones can generally be disengaged while the mill is running, but the wheels must be put in gear during stoping time, unless a clutch arrangement has been provided, as has been done in exceptional cases.

5. The following are the details of the driving and feeding apparatus of a pair of horizontal millstones (the upper stone running) from the neck inclusive upwards. The neck of the stone spindle is generally fitted in a square cast-iron block which is fixed by means of wooden wedges in the bedstone. The remaining spaces round this block are filled up with plaster of paris. There are generally three neck brasses fitted into this cast-iron block, and behind them are fitted some adjusting wedges which carry in their downward prolongation some adjusting screws by means of which they can be raised or lowered in order to adjust the neck brasses to the neck of the spindle. The stone spindle, after passing through the neck-bearing in the bedstone, generally has a square conical head, or a round conical head, with a key-way over which is fitted the cock-head, which consists of a cast-iron block, generally rounded at the top, with a square or round conical hole through it, which fits on the top of the spindle. In two opposite places on the upper part of this cock-head a recess is provided into which fits the driver, an iron bar, bent in a circle like a bow, carrying two pivots on its end which fit in corresponding sockets in the runner-stone. This driver has a small round groove in the highest point of its inner circle, which rests on the top of the spindle, which is provided with a round pointed toe so as to permit an oscillation of the runner-stone in two directions, viz., on the top of the spindle, in the recesses of the cock-head, and also on the pivots of the driver. Just under the cock-head generally a ring and a cap are provided in order to keep the dust out of the neck brasses. If the so-called silent feed arrangement is used, there is a kind of saucer fixed on the top of the cock-head, above the driver. An adjustable feed pipe reaches down to this iron saucer, and according to the space left between saucer and pipe there will be more or less feed passing between the stones. Above the feed pipe is the feed hopper, which is generally supported on the stone-casing by means of a tripod. If the the stones are fitted with an exhaust arrangement an air-tight joint is provided between the top of the runner-stone and the stone-casing, generally consisting of a wide leather hose which carries a cast-iron ring on its lower end, and which fits in corresponding grooved ring fastened around the eye of the runner-stone.

6. In horizontal roller mills the pressure is applied by means of springs either against bearings which move on slides on the roller frame, or against the ends of levers in which the bearings are carried. In Wegmann's and Gray's rolls the bearings are carried on one-armed levers, in other rolls double-armed levers are used. In most cases horizontal rolls are provided with a stop arrangement which prevents the rolls from coming into too close contact. In horizontal rolls, when the feed passes between the rolls, all four bearings of each pair are subjected to pressure, which causes a corresponding amount of friction. In three-high roller mills it is claimed that the middle roll is to a great extent relieved of pressure, the pressure between the top pair being balanced by the pressure between the bottom pair. Besides, it is said that as there are but six bearings required for two pairs of rolls, against eight in a corresponding horizontal roller mill, that less power is required for driving them. In Daverio's three-high roller mills two angle levers are coupled with each other on each side by means of a small double lever with unequal arms, and the pressure-spring is connected with this double lever by means of a pivot bolt. In Ganz's three-high roller mill a peculiar friction relieving apparatus, Mechwart's anti-friction ring, has been applied, which has the purpose of applying the pressure direct to the roller spindles, instead of directly against the bearings. In many horizontal rolls, also, friction rolls are arranged in order to transfer the pressure from the roller bearings to the bearings of the friction rolls. As the diameter of the bearing is thus reduced and the speed generally decreased, it is likely that some saving of power may result from such apparatus, but as a rule they complicate the roller mills considerably, and are apt to get out of order.

7. In reducing wheat to flour, middlings and offal, by rollers in the least number of breaks, it would be preferable to use the larger rolls of eighteen inches diameter, because the duration of contact between feed and rolls is longer on large rolls than on smaller ones, and if it is intended to reduce the wheat in the least possible number of breaks, a longer duration of contact during each break is desirable in order to be able to finish the bran.

8. In order to reduce wheat to flour, middlings and offal, so as to make the least percentage of break flour, and the greatest percenage of middlings, I would adopt a gradual reduction system with six breaks, on the following machines: 1, Jonathan Mills' reduction mill; 2, squeezing on smooth chilled iron rolls, to be followed without intervening scalper, by Jonathan Mills' reduction mill; 3, Jonathan Mills' reduction mill; 4, fluted chilled iron roll; 5, fluted chilled iron roll; 6, fluted chilled iron roll; the bran to be finished on a horizontal bran duster.

9. In a gradual reduction mill, with six breaks I would use the following number of flutings per inch on the rolls: First break, 10; second, 13; third, 16; fourth 20; fifth, 24; sixth, 28. I would prefer wire centrifugals for scalping, because they detach many middlings which would otherwise pass into the next break, and there cause an increased production of break flour. I would cover the scalpers with nickel-plated wire, No. 18 for the first and second breaks, No. 20 for the third and fourth breaks, No. 24 for the fifth break, and No. 28 for the sixth break.

10. In replacing a reel covered with Nos. 12, 13 and 14 silk by a centrifugal, it should be clothed with Nos. 14, 15 and 16, in order to produce a corresponding quality of flour.

11. In order to separate the semolina from a quantity of meal dressed through the second, third and fourth break scalpers, it should be first dressed through a wire centrifugal clothed with No. 30 wire; which will throw the coarser middlings over the tail, and allow them to go through the grading reel to the respective purifiers, and thence to the reduction rolls. The meal which has passed through No. 30 wire should be dressed on a silk centrifugal clothed Nos. 13, 14, 7. The flour from Nos. 13 and 14 can go as bakers' flour to be packed; the semolina, which has passed through No. 7, can go direct without being purified, to chilled iron or, better, porcelain rolls, to be reduced, and the fine middlings, which are thrown over the tail of the silk centrifugal, should first be graded, then purified and reduced on porcelain or chilled iron rolls, according to quality.

[THE END.]

## NEW BRUNSWICK HOME MADE BREAD.

"*Marian*" a New Brunswick correspondent of *The Home Farm* writes as follows:

I have often wondered that the people across the line think they must have shortening in their bread, and must eat it warm. I think such bread is unhealthy and is bad for dyspepsia. We make bread with home made hop yeast, and I will tell my way of doing it.

HOP YEAST: Take a large handful of hops (we raise our own hops,) put them in from two to three quarts of water and let them boil till the strength is out of them. The best way is to put them in a small bag as it saves the trouble of straining them. Grate one-half dozen potatoes add one-half cup of sugar, one table-spoonful of salt, one table-spoonful of flour, then stir the whole into the boiling hop water, and let it boil a few minutes, stirring it well. Set it to cool, and when cool enough stir in half a cup of good yeast. Put it in a warm place to rise and when risen put it into a jug, cork tightly, and keep in the cellar. This yeast will keep good for from six to eight weeks.

When I want to make bread I mix the sponge in the evening. I take three pints of luke-warm water (this will make three common sized loaves,) into this stir enough sifted flour to make a stiff batter, add a tablespoonful of salt, one-half cup of yeast, and three baked potatoes well pulverized. Cover this up warm, and set where there will be no draughts.

In the morning there will be a dish of foaming sponge. Into this *knead well* sufficient flour to make it into a firm dough. Set it again into a warm place to rise and when risen knead it down again. It will soon rise again when it may be moulded into loaves and put into the oven pan to rise again. Then when it has risen sufficiently—but do not let it get too light as it will rise some in the oven—put it into the oven to bake. The oven should be quite hot at first and should gradually get cooler. A good sized loaf will require about an hour to bake. By making bread according to these directions, with a little practice, I think you can have good bread at all times.

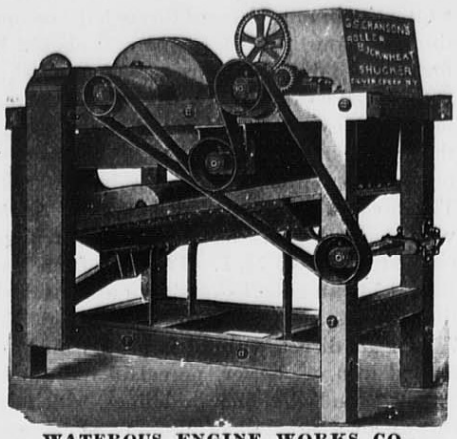
Some people prefer mixing the sponge in the morning, but I always think I have to hurry it too much, and it generally has to be baked in the evening.

## SETTING A BELT ON A QUARTER-TWIST.

Few persons have any rule for setting a belt on a quarter-twist, the general practice being to keep trying until it comes right. An ordinary straight belt must run squarely on to the pulley or at right angles with the shaft. Hence if we wish to connect with a belt two horizontal shafts, at right angles with each other, say an engine shaft near the floor, with a line attached to the ceiling, it will require a quarter turn, and the principle governing a straight belt must be observed. First ascertain the central point on the face of each pulley, at the extremity of the horizontal diameter where the belt will leave the pulley, and set that point on the driven pulley plumb over the corresponding point on the driver. This will cause the belt to run squarely on to each pulley, and it will leave at an angle, greater or less according to the size of the pulleys and their distance from each other. This rule will render the setting of a quarter-twist as easy and as certain as the setting of an ordinary straight belt.—*Wood Worker.*

An oil for belting is recommended which consists of nine parts of linseed oil and four parts of litharge, ground in water. These, boiled to a plastic consistency, then liquefied by an addition of turpentine, furnish an oil which, it is claimed, possessess many admirable qualities.

# DO YOU MAKE BUCKWHEAT FLOUR?



—BY USING—

## CRANSON'S

SILVER CREK ROLLER BUCKWHEAT

## SHUCKER

—YOU CAN—

INCREASE YOUR PROFITS,
BETTER YOUR QUALITY,
SATISFY YOUR CUSTOMERS.

Send for full Descriptive Circular, giving prices, sizes, Terms, etc.

**G. S. CRANSON & SON,**
**Silver Creek, Chaut. Co., N. Y.**

**WATEROUS ENGINE WORKS CO.,**
**Brantford, Ontario, Sole Agents for Canada.**

[Please mention UNITED STATES MILLER when writing].

---

## 5300

'Triumph' Power Corn Shellers

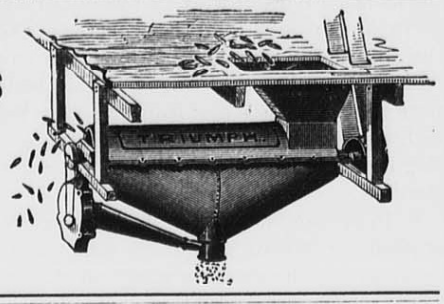
**IN USE.**

Send for Descriptive circular and Testimonials.

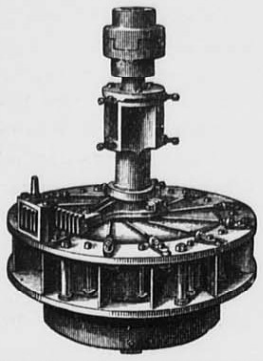
ADDRESS

**PAIGE MANUFACTURING CO.,**

**20, 22 and 24 St. Clair St., Painesville, O.**



---



**JAMES LEFFEL'S IMPROVED**

# WATER WHEEL,

**Fine New Pamphlet for 1883.**

The "OLD RELIABLE" with Improvements, making it the **Most Perfect Turbine now in use**, comprising the **Largest** and the **Smallest** Wheels, under both the **Highest** and **Lowest** Heads in this country. Our new Pocket Wheel Book sent free. Address,

**JAMES LEFFEL & CO., Springfield, Ohio.**
**and 110 Liberty St., New York City.**

[Mention this paper when you write to us.]

---

# RICHMOND MANUFACTURING CO.,

**LOCKPORT, N. Y.,**

MANUFACTURERS OF RICHMOND'S CELEBRATED

Warehouse Receiving Separator, Grain Separator

AND OAT EXTRACTOR,

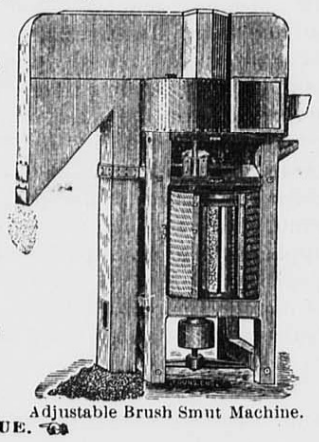
**WHEAT SCOURERS,**

—AND—

**Wheat Brush Machines,**

UPRIGHT AND HORIZONTAL BRAN DUSTERS,

CENTRIFUGAL FLOUR DRESSING MACHINES.



Adjustable Brush Smut Machine.

**Thousands of these Machines are in successful operation, both in this country and in Europe. Correspondence solicited.**

SEND FOR DESCRIPTIVE CATALOGUE.

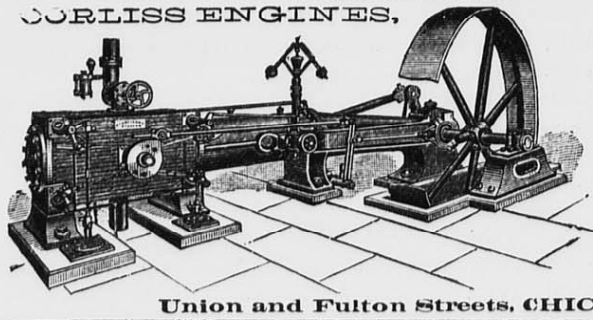
[Mention this paper when you write.

---

# FRASER & CHALMERS.

—MANUFACTURERS OF—

CORLISS ENGINES,



Of Superior Construction,

**Slide Valve Engines,**

Horizontal, with Single Valves, Fixed Cut-off Valves, or Adjustable Cut off Valves, Hoisting Engines, Pumping Engines.

Tubular Boilers, Cylinder Boilers. Two-flue Boilers, and Portable Boilers

Outfits of Improved Mining Machinery for the systematic smelting and concentration of ores.

*Send for Descriptive Catalogue.*

**Union and Fulton Streets, CHICAGO.**

---

# GANZ & CO.,

**Budapest, Austria-Hungary.**

We are the first introducers of the Chilled Iron Rollers for milling purposes, and hold Letters patent for the United States of America. For full particulars address as above.

[Mention this paper when you write to us,]

---

**Mill Furnishing, Foundrymen & Machinists.**
**Established 1851.**
MANUFACTURE
**MILL STONES.**
**Flouring Mill Contractors.**
**Send for Pamphlet.**
**Nordyke & Marmon Co**
**Indianapolis, Ind.**

[Mention this paper when you write us.]

---


[Mention this paper when you write us.]

---

CHOICE BEVELLED EDGE

# FLOUR BRANDS

For two dollars and upwards. Also RUBBER STAMPS BURNING BRANDS, SEALS, STEEL NAME STAMPS LETTERS AND FIGURES, Etc. Orders promptly attended to

**CHAS. H. CLARKE,**
Box 114 82 Wisconsin St, Milwaukee.

---

## Milwaukee & Northern Railroad.

THE OLD RELIABLE ROUTE.

17 Miles the Shortest Line

—TO—

**GREEN BAY,**

Oconto, Fort Howard, Depere, Menasha, Neenah, and Appleton

—THE NEW ROUTE TO—

**New London, Grand Rapids, Chippewa Falls, Eau Claire, and all points in**

CENTRAL AND NORTHERN WISCONSIN.

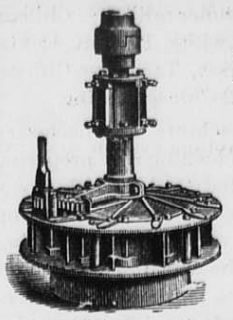
The new line to Oconto is now completed, and opens to the public the shortest and best route to all points on the Michigan Peninsula.

**CONNECTIONS.**

AT PLYMOUTH with Sheboygan and Fond du Lac Division Chicago & North-Western R'y for Sheboygan and Fond du Lac.
AT FOREST JUNCT'N with Milwaukee, Lake Shore and Western Railway.
AT GREEN BAY with Chicago & North-Western and Green Bay, Winona & St. Paul Railroads, for all points North and West.

**C. F. DUTTON,** Gen'l Supt. **F. P. REGAN,** Gen'l Ticket Agent.

---



## POOLE & HUNT'S
## Leffel Turbine Water Wheel

Made of best materials and in best style of workmanship.

**Machine Molded Mill Gearing**

From 1 to 20 feet diameter, of any desired face or pitch molded by our own SPECIAL MACHINERY. **Shafting, Pulleys, and Hangers,** of the latest and most improved designs.

***Mixers and General Outfit for Fertilizer Works.***

**Shipping Facilities the Best in all Directions.**

**POOLE & HUNT, Baltimore, Md.**

**N. B.—Special attention given to Heavy Gearing for Pulp and Paper Mills.**

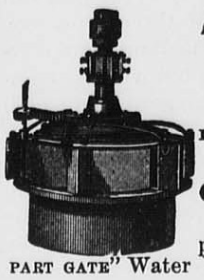
[Mention this Paper when you write to us.]

---

# Stout, Mills & Temple,

**DAYTON, - - - OHIO.**

MANUFACTURERS OF THE



**American Turbine Water Wheel,**

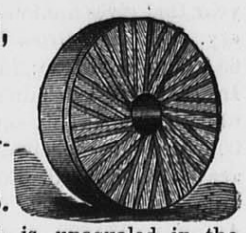
**Best Quality French BUHR MILLSTONES.**

Sole Agents in Dayton for the sale of

DU FOUR & CO'S CELEBRATED BOLTING CLOTHS.

**Flour and Paper Mill Machinery, Best Chilled or Porcelain Rolls for Crushing Wheat and Middlings and**

**GENERAL MILL FURNISHINGS.**



The AMERICAN TURBINE, as recently improved, is unequaled in the power utilized from a given quantity of water, and is decidedly the BEST PART GATE" Water Wheel ever known. It has also been otherwise greatly improved.

**Large Illustrated Catalogue Sent Free on Application.**

[Mention this paper when you write to us.]

---

## BOTTLED BEER.

**VOECHTING, SHAPE & CO.,**

SOLE BOTTLERS OF

**JOSEPH SCHLITZ BREWING COMPANY'S**

CELEBRATED MILWAUKEE LAGER BEER.

**Cor. Second and Galena Streets,**

**MILWAUKEE, - - - WISCONSIN.**

BOTTLERS' SUPPLIES CONSTANTLY ON HAND.

[Parties corresponding will please state where they saw the advertisement.]

---

# STEEL CASTINGS

**FROM 1-4 to 10,000 LBS. WEIGHT.**

True to pattern, sound and solid, of unequaled strength, toughness and durability.
An invaluable substitute for forgings or cast iron requiring threefold strength.
Gearing of all kinds, Shoes, Dies, Hammer-Heads, Cross-Heads, for Locomotives, etc.
15,000 Crank Shafts and 10,000 Gear Wheels of this steel now running prove its superiority over all other steel castings.
CRANK SHAFTS, CROSS-HEADS and GEARING, specialties.
Circulars and price list free. Address,

**CHESTER STEEL CASTINGS CO.,**
407 LIBERTY ST., PHILADELPHIA, U. S. A

Works, CHESTER, PA.
[Mention this paper when you write us.]

---

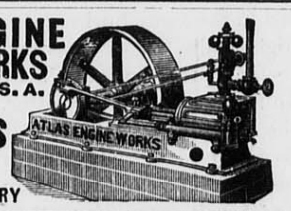
Send for Catalogue and Prices.


# ATLAS ENGINE WORKS

**INDIANAPOLIS, IND., U. S. A.**

MANUFACTURERS OF

**STEAM ENGINES AND BOILERS.**




CARRY ENGINES and BOILERS IN STOCK for IMMEDIATE DELIVERY

---

# HARRIS-CORLISS ENGINE.

—BUILT BY—

## WM. A. HARRIS, Providence, R. I.

**Built under their original patents until their expiration. Improvements since added: "STOP MOTION ON REGULATOR," prevents engine from running away; "SELF-PACKING VALVE STEMS" (two patents), dispenses with four stuffing boxes; "RECESSED VALVE SEATS" prevent the wearing of shoulders on seats, and remedying a troublesome defect in other Corliss Engines, "BABBITT & HARRIS' PISTON PACKING" (two patents). "DRIP COLLECTING DEVICES" (one patent). Also in "General Construction" and 'Superior Workmanship."**

The BEST and MOST WORKMANLIKE form of the Corliss Engine now in the market, substantially built, of the best materials, and in both Condensing and Non-Condensing forms.

The Condensing Engine will save from 25 to 35 per cent. of fuel, or add a like amount to the power and consume no more fuel. Small parts are made in quantities and inter-changeable, and kept in stock, for the convenience of repairs and to be placed on new work ordered at short notice.

NO OTHER engine builder has authority to state that he can furnish this engine

The ONLY WORKS where this engine can be obtained are at PROVIDENCE, R. I., no outside parties being licensed.

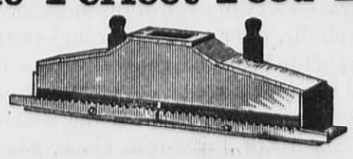
**WM. A. HARRIS, Proprietor.**

***Send for copy Engineers and Steam Users Manual, by John W. Hill, M. E. Price $1.25.***

[Mention this paper when you write to us.]

---

## The Perfect Feed Box



It insures a perfectly even distribution of the middlings over the entire width of the cloth. Every miller will appreciate this. Fits all purifiers. Address,

**CASE MANUFACTURING CO.,**
COLUMBUS, OHIO.

W. E. CATLIN & CO., 68 LAKE ST., CHICAGO, ILL. AGENTS.

[Please mention this paper when you write to us.

---

## The E. T. Barnum Wire & Iron Works,

MANUFACTURERS OF


**WIRE CLOTH**

For Paper and Flouring Mills, Breweries and Mining. **STEEL TEMPERED WIRE CLOTH,** for **BOLTING PURPOSES,** Wire Office and Counter Railing, Wrought Iron Fences, Wire Signs, Stable Fixtures, Weather Vanes, Roof Cresting, &c.

**WIRE AND IRON WORK OF EVERY DESCRIPTION.**

MANUFACTURED BY

Write for Catalogue, stating your wants, and we will make you estimate. Mention this paper.

**The E. T. Barnum Wire & Iron Works,**
**Detroit, Mich.**

[CONTINUED FROM FRONT PAGE.]

before the first grinding, before the second grinding, and before the third grinding. The final tailings are treated separately on porcelain rollers.

The bulk of the flour is produced upon the millstones. The flours from the first and second grinding at the middlings are mixed together to form the first quality, and the mixture averages in amount 32 per cent. upon the cleaned wheat.

The second quality flour is from the third grinding of the middlings mixed with the flour from the 2nd, 3rd, 4th and 5th breaks of the wheat, and the two breaks upon the semolina and germ. It averages in amount 32 per cent. upon the cleaned wheat.

The third quality flour, made from redressing the dunst, averages in amount over four per cent. upon the cleaned wheat.

The first, second and third quality flours, when mixed together, form therefore over 68 per cent. of a high-class straight grade flour upon the cleaned wheat.

The balance of the flours is made up of first break flour, sixth break flour, germ flour, and flour from purifier tailings; the amount of the same can be made to reach 4 to 6 per cent. on the cleaned wheat by the use of porcelain rolls, if the miller desires to make his tailings as bare as with ordinary flat grinding.

The question of yield of flour is of great interest to millers. Assuming that with a gradual reduction system the same yield of flour of all kinds is made as upon the ordinary system of flat grinding, the main difference in the final results is that in the ordinary flat grinding system the impurities in the flour are spread throughout the entire bulk of the flour, whereas with gradual reduction the impurities can be confined to about 4 or 5 per cent. of the flours, thus leaving the bulk of the flour of a high-class quality. Taking 100 lbs. of average rough wheat, the amount of the refuse removed by the wheat cleaning and preparing machinery is usually about 3 lbs., leaving 97 lbs. to be dealt with by the flour producing machinery. But it is usual for millers to calculate upon the cleaned wheat; and taking 100 lbs. of clean, unscoured wheat, it will be found that this 100 lbs. consists of about two per cent. of thin, easily removable outer skins, and two per cent. of germ, the remainder being the bran proper and the white interior flour-producing kernel. In good, careful flat grinding practice it is possible to obtain 74 lbs. of a staight grade flour from 100 lbs. of good quality cleaned wheat.

Without going into full details of certain trials, it may be stated that experiments carried out with millstones when grinding germ and bran, show that out of 100 lbs. of cleaned wheat, 1 9–10 lbs. of bran and outer skins and 6–10 lb. of germ are ground into flour which will pass through a silk mesh of 134 to the inch, thus making the actual impurities in the 74 lbs. of straight grade millstone flat grinding flour equal to 2½ lbs. in weight.

If it were possible to take out the 2½ lbs. of impurities, the balance, viz., 71½ lbs. would represent the greatest extent of good flour which could be obtained from clean wheat by millstones. But in practising gradual reduction this figure cannot be reached, and it is within the mark to conclude that 68 to 70 per cent. on clean wheat is the greatest extent of high-class straight-grade flour which it is possible to obtain by gradual reduction; all flours above that amount must of necessity be full of impurities.

Some millers are under the impression that the germ and bran cannot be reduced into flour by rollers. It may therefore be of interest to state that actual trials show that when the rolls are set exactly as in ordinary work for flour producing, and with only one passage of the material through the rolls—1st, that smooth iron rollers will reduce three per cent. of the germ into flour which will pass through silk cloth having 134 meshes per inch; 2nd, that porcelain rolls will reduce five per cent.; and 3rd, that grooved rolls will reduce 7 to 12½ per cent.

The rolls, when working on bran, produce only a slightly less percentage than when they are working on germ. These facts show that it is not good to pass bran or germ very often through rollers which are set for producing flour. This also confirms the view that whether rollers or millstones are used for producing flour the middlings should be as pure as possible.

The great objections to making flour upon smooth rollers is the small quantity of work done, their tendency to cake the material; also their production of a fluffy intermediate product or residue which cannot be purified. The millstone always produces a residue of a sharp character, which may be purified to advantage between the various grindings. With the same wheat a greater yield of good flour can be made by a combined system than can be made by iron rollers alone. In comparing the flours made by rollers and millstones from the same middlings made by the gradual reduction system many millers are led into error by an unfair comparison; the only true way is to take 100 lbs. of the pure middlings and reduce the same to flour, leaving the residue in each case of the same weight. If this is done carefully it will be seen practically that the millstone is the most profitable flour producer.

Another point to be observed is that flours cannot be judged by their comparative whiteness, because their whiteness depends upon the size of the flour particles, and not upon the absence of impurities. The only real commercial test is that of the baker. The fact that low grinding by rollers working on a seeming gradual reduction system, gives superior results to low grinding by millstones, has caused a certain rush into low grinding roller mill systems, which, in the course of time, will have to be abandoned for gradual reduction. Many thousands of pounds sterling have been spent in devising and testing cheap ways of gradual reduction. Flour can only be improved in quality by the elimination of impurities at each stage. It is quite useless to attempt "short cuts" and quick, easy ways of gradual reduction milling. All such attempts have failed to give satisfaction in the past, and they will fail in the future.

The system of gradual reduction is simple and it is perfect; all that the miller can hope to do is to obtain the best machine for each stage, and if he carries out the system automatically and faithfully in every detail the result is sure to be satisfactory. It is certain that it may be laid down as axioms—1st, that in a thorough automatic gradual reduction system there must be no returns whatever. 2nd, that as little flour as possible must be made until as much as possible of the bran and germ has been eliminated.

Seeing that gradual reduction requires much more machinery than ordinary flat grinding, it follows that there is more room for the application of skill and knowledge in dealing with the machinery. There is also much more room for mistakes. It is not sufficient to cram a lot of good machines in a mill with the expectation that good results will follow somehow. Millers will find that great care is required in the arrangement, and more care still in the after-working, of the mill, to suit varying wheats, if any profits are to be made.

Many millers are quite confused in their ideas of modern milling. To make the matter clear it may be stated that the benefits arising from gradual reduction are conferred by the use of the system and not by the use of any particular machine. Gradual reduction consists of many stages, each of which can be carried out in different ways and with different machines. The great object of the miller should be to use in each stage that machine which experience proves to be the most suitable. It is undoubtedly a fact that every machine in a flour mill may be used to advantage at some one or other of the various stages, providing that sufficient intelligence and patience is given to find each machine its legitimate work.

A point of great importance to millers is the question of the amount of feed to be given to each machine. Many machines are condemned as useless because they will not swallow enormous feeds. Every machine has its limit, and he is a wise miller who looks for good work alone. Every machine should have just the amount of feed at which it shows its greatest efficiency.

From the foregoing will be seen that a combination system of milling is advocated in which millstones are retained for the reduction of high-class middlings into flour, when such middlings are practically free from germ and bran.

Another machine advocated is the use of disc mills for making the breaks upon the wheat instead of millstones or grooved rollers because it is found that disc mills make more and better semolina and middlings, and a better extraction of unbroken germs and outer thin skins of the wheat. The disc mill is also a machine of few parts, simple, durable, and requires very little attention.

The first break by disc mills cannot be equalled by grooved rollers, and the same remark applies to the after breaks. It has always been found that the best and sharpest middlings and semolina have been produced by a quick, sharp blow, such as is given by the discs. Grooved rolls work with a slow, crushing, squeezing blow, which affects the quality of the middlings so much that they are not easily purified afterwards. This is the case especially when the grooved rollers become worn. Another point is that it is very difficult to maintain grooved rollers at an exact distance apart on the latter breaks; thus, if the feed stops, the rolls are liable to cut each other away. This last point is easily accomplished in the disc mills, and they can be set one-thousandth of an inch apart.

Many millers make objections to the disc mill on the score of the speed at which it runs. The speed is 700 revolutions per minute, and if the discs are given a fair rate of work they do not heat to a greater temperature than about 110 degrees Fahrenheit. The rim of the running disc revolves at about the same speed as the rim of a millstone. The bearings do not give any trouble in practice; they are only 1¼ in. diameter, and being long they keep cool. The speed is only like that of the ordinary exhaust fan of a mill. The fire insurance companies rate one roller mill as being equal to three disc mills, so that whether a miller adopts discs or rollers the cost of the fire insurance amounts to the same figures.

It is perhaps as well to make a few remarks upon the power required in gradual reduction milling. Carefully taken diagrams from an engine driving a complete roller mill show that the indicated horse power given out by the engine amounted to 25 6-10 for every sack of flour of 280 lbs., that was made in one hour, the wheat being American winter wheat of good quality. The mill in question contains eleven sets of roller mills, thirteen reels, seven centrifugals, one bran brush, and four purifiers, for the production of flour. Also three machines and exhaust fan for wheat cleaning, together with all the necessary conveyors, elevators, shaftings, &c., for driving.

The whole of the machines mentioned were at work during the time the diagrams were taken, so that the power given above includes for the entire mill. The mill is somewhat small in size, but, making allowance for this, it may be stated that it requires about twenty indicated horse power to produce a sack of flour of 280 lbs. in weight in a complete mill, when working on a gradual reduction system. This power covers all the entire machinery of the mill; and its amount is about equal to that usually taken by ordinary flat grinding mills.

It may be said that an old-style mill will turn out about the same amount of flour per hour, with the same power, when it is converted to a gradual reduction system. A combination system of gradual reduction, with disc mills for breaking the wheat, smooth roller mills for extracting the germ, and millstones for producing flour, is in operation at the mill of Mr. Blackledge, Liverpool. A similar system is also at work in the mill of M. Guyot, at Charenton, near Paris. The latter mill has been carried out by Messrs. Rose Freres, milling engineers, of Poissy, under the direction of the writer. This mill was started last Saturday, and there are samples in the room of the finished products. During this week the mill of M. Guyot will be visited by the French Milling Commissioners, who are to test the system and to report on its value when compared with other systems which they have been investigating during the last few months In a few weeks the report of the French Milling Commission will be issued to those who have subscribed to the milling fund in France, and the milling public may look forward with great interest to this report, as it is credibly stated in France, by those interested, that the Commissioners are giving every possible care and attention to honestly, thoroughly, and systematically test the various systems of milling which have been offered for their inspection.

Owing to delay, which could scarcely be avoided in so complicated a matter as the exhaustive examination of many milling systems the French Commissioners are proceeding slowly with their work, and they have been subjected to considerable adverse criticism in the French and other milling papers. It is, however, to be hoped that in such an important matter they will pass such criticism without notice, and give a careful report, which cannot fail to be of great value to the milling world.

In taking a review of the milling situation, it is probably that in the future the chief merchant milling centres of the world will become on a level as regards their quality of produce. In such a case that country which has the cheapest and strongest wheat will take the lead and secure the manufacture of the highest class of flours.

In regard to the highest class of flour, it is scarcely likely that English or French millers will be able to compete in price with the American millers in seasons when strong wheat is plentiful in America; but for all other kinds of flours, or for a straight grade flour, the gradual reduction millers here or in France will easily hold their own against any outside competition.

The future is not, however, so flattering to the old-style millers, for they must either move on or die out; it is only a question of time.

Another matter should be mentioned. It may be imagined that the writer has a predilection for millstones; therefore, it is only right to state that, as a member of a firm of milling engineers who are manufacturers of every class of mill machines, it is immaterial what machines a miller may order from the firm; but as the firm commenced the manufacture of grooved rollers, mooth rollers, and porcelain rollers nearly seven years ago, before rollers had been adopted to any great extent in England, it may fairly be considered that their experience is worth noting. Indeed, as milling engineers who are desirous of being abreast with the times, it has been the aim of the firm to study every phase of the roller question, and to exhaustively enquire into the practical working of every class of machine. This has been done at a great cost, because no milling firm of engineers can afford to be behind the times or to go in a wrong direction. It is claimed for the combined system that by its use—firstly, it is less costly to alter the mills over to the gradual reduction system; secondly, it produces a longer length of straight grade flour than can be attained by roller mills alone; thirdly, that such straight grade flour is of a better quality.

Referring to the remarks of our worthy President, I believe that the millstone is doomed as far as regards grinding wheat on the old style, but for grinding good middlings it will always be retained by those who best understand their own interests.

---

The exceedingly delicate photographs (colored) on glass, which have come lately into fashion, are produced by fixing a paper photograph upon a cushion shaped glass with transparent cement, and when it is dry rubing away two-thirds of the photograph with sand-paper. The thin film left is then rendered transparent by soaking in melted paraffine wax, after which transparent colors are applied, which appear softened down when looked at from the front. The background and heavier portions of the picture are then painted in a body color upon the face of another cushion shaped piece of glass, which is afterward fixed behind the first one.

---

As England is the best foreign field for American inventions, the modification made in her patent laws in the last session of Parliament, and which go into effect on January 1, 1884, are of general interest to American inventors, especially as the reduction of agent and government fees for provisional and final specifications affords encouragement to the taking out of a larger number of patents. The extension of provisional protection to nine months, is a valuable feature in the new arrangements, and not less so the granting to the inventor the right of publishing his invention six months prior to the application for a patent. Hitherto previous publication—even the taking out of an American patent previous to the application and the filing of a specification for a British patent—has invalidated any claim to the latter. The establishment of an annual tax in place of stamp duties that had to be fully paid up on the issue of a patent, such annual tax to date only from the fourth year after the invention is granted, enables the patentee to test the marketable value of his property before commiting himself to the full outlay for maintaining it. This is not all. The wranglings over conflicting claims to a patent that have hitherto taken place before the British Patent Office officials are put an end to. The decision of these officials in the case of valuable inventions was by no means decisive, litigation only being transferred to the Court of Chancery. The unjust provision by which a foreign invention could be secured in England by the first applicant, irrespective of his abstract right to it, is done away with. Patents are henceforth only to be granted to inventors or their assignees.—*Bradstreet's.*

---

Higbee & Co., millers, running mills at Bellevue, Clyde and Fremont, Ohio, are reported to have suspended.

(CONTINUED FROM PAGE 21).

the changes going on are much less violent. There is, therefore, less danger of excessive decomposition of the albuminoids and starch. After standing for an hour, or perhaps rather longer, in order that the fermentation may ærate the whole batch, the dough is cut up, scalded and put in the oven. In about from thirty-five to forty-five minutes the dough has become bread, and well-baked loaves should be the result. In the oven, the yeast is rapidly killed at the high temperature; with sound dough the interior of the loaf does not undergo much chemical alteration, but the starch of the crust is changed into dextrine; this browns, and hence the characteristic colour.

It may be felt by some that my picture of a bakehouse is almost too idealistic; in the North of England and Scotland these conditions, however, obtain in many instances. The South has in this matter been far behind; still even with us there is evidence of a waking up. Mr. Napper, of Brighton, has, I believe, led the van in this matter of mechanical kneading, and in his bakery I have had the opportunity of carefully studying the practical aspects of baking.

So far, we have been supposing that the flour employed has been of high quality; but there are times when inferior varieties have to be used. Fortunately, even under these circumstances, the flour is generally *potentially*, rather than *actually* bad, that is to say, it is not its present state, but that produced in the dough that is so deleterious. In such cases, where a fermented loaf is made, the best plan will be to make a sponge with a better quality flour, if practicable; failing this, the sponge should be made with a strong yeast and a small quantity of flour, keeping the temperature as low as possible and getting through the "raising" operation as quickly as can be managed. The yeast must be pure, and probably the use of "fruit" or added sugar would be advantageous. The aim of the baker should, in fact, be to get his sponge raised under the conditions least favourable to the decomposition of the starch by the active albuminoids. Among other methods suggested and used with such flours has been the addition of alum; this substance greatly dimishes the activity of the albuminoids. Lime-water is equally, if not more, efficacious than alum, and acts in the same way, preventing the change of starch into gum and sugar, but scarcely interfering with the yeast fermentation. It is probable that by experimenting with other antiseptic bodies some substance might be found having the same beneficial action as alum or lime-water, and non injurious when absorbed into the system. There is another way of treating such flours, superior to either of these, and that is by artificial aëration. You are doubtless familiar with the Dauglish method of performing this operation. Carbon dioxide gas is stored in a gas holder, and then pumped into water under pressure, making, in fact, "soda water." The flour and salt are kneaded into dough with this water in a globular receiver, so arranged that the pressure is still maintained. The kneading is complete in about five minutes; through an opening at the bottom of the receiver the dough is then permitted to escape, being forced out by the gas. Directly it reaches the open air the pressure is relieved, and the "soda water" used in making the dough effervesces, as it were, within the loaf. In this way it gets "raised," and is immediately placed in the oven. The process has very many advantages; it is cleanly and quick; the dough being made with cold water and immediately baked, there is no time for decomposition by the albuminoids to set in; further, without addition of yeast, the danger of acid fermentation is lessened. The bread so produced has one disadvantage, and that is that it does not possess the pleasant "nutty" flavour so characteristic of the best fermented bread. But the choice, unfortunately, is not between such pleasant-flavored bread and that which has been aërated, but between the absence of flavor of aërated bread and the sour, sodden taste of the badly fermented loaf. I am sure that of the two the aërated bread is infinitely preferable; I also feel that it may be possible to make the flavor of aërated bread approach more closely to that of the best fermented bread than it now does. The aërated bread is much more easily digested by people liable to dyspepsia, not being heavy and having no tendency to cause flatulency. I am able to speak very highly of it from personal experience as an article of diet for the sick room, having myself been able to eat and retain it on the stomach when ordinary bread, cake and most other kinds of food were rejected.

The danger with bread made from bad flour is not over when the loaf is baked; such bread may not then taste sour and yet may most unpleasantly develope acidity before twenty-four hours old. In this case the change begun in the flour during sponging has only been delayed by the heat of baking, and again sets in in the cold loaf. Here, again, the remedy is to lessen the time of sponging, taking the other precautions before mentioned, or, these failing, to ærate such flour. The tendency to go sour might also be lessened by the use of lime water.

One result of writing this paper has been to impress upon me how much there is that yet remains to be done, from a scientific point of view, in order to give accurate data as to the important changes which occur during bread making. Hastily summing up a very few matters on which further information is needed, I may mention:—(1) Recent analyses of wheats and flours, dealing especially with the different qualities of flours produced by processes of gradual reduction from the same wheat; these should give their physical as well as chemical properties, and should indicate their relative nutritive value. (2) Microscopic and chemical examination of different varieties of yeast, with the view of ascertaining their purity, strength, and comparative characters. (3) Scientific examination of the phenomena occurring during sponging or fermentation, with the object of determining with exactitude the results of making changes in the time and temperature of sponging, the kinds of yeast and flour used, the benefit or otherwise of using "fruit" or adding sugar, the general object being, as far as possible, to find out exactly what method of manipulation will best suit various descriptions of flour. (4) The most satisfactory modes of working with inferior flours. Experiments on these matters should not be confined to the laboratory; whatever results are obtained should be controlled by work done on the large scale in the bakehouse: it being always necessary to bear in mind that any modifications suggested should be of such a nature as to stand a practical test, and be simple enough to be followed by the ordinary workman. I venture here to suggest as a subject for your consideration the practicability of doing something in the way of furthering scientific research into the principles of bread making. Results would be obtained that could not fail to be of value to bakers and indirectly to millers. Might not such an association as yours take the steps that would lead to such researches being carried out?

May I, for a moment, before concluding, direct your attention to the question of Technical Education. The millers, as well as other classes, must necessarily feel this want. For a number of years, during which I have been head science master of the Brighton School of Science and Art, this subject has received my most careful study and consideration. As a result of experience I am of opinion that it is well for those whom it is intended to place in a practical profession like milling, to let them spend the last twelve months of their school life in directly studying the technical sides of the sciences most directly connected with their future profession. I have accordingly organized at Brighton such a course of study of technical chemistry and analysis, mechanics, &c., as is likely to be most directly useful to the student in commencing his professional work. Arrangements have also been made for taking resident pupils. I shall be pleased to afford, on behalf of my committee, any information in my power to gentlemen interested in the subject.

I feel that of necessity this sketch of mine is hurried and imperfect. I thank you for your attention, and trust that I may have at least succeeded in interesting you in this scientific side of practical bread making. I hope that one result will be that thorough and exhaustive research will ere long be made into the scientific principles underlying this most important national industry.

[Correspondence of the UNITED STATES MILLER.]

## WHAT WILL WE DO WITH OUR FIRST BREAK FLOUR?

EDITOR UNITED STATES MILLER.—This question is attracting the attention of a number of small millers throughout the country, more particularly than any other at the present time. Our large and most successful mills are not troubled with it in contradistinction to flour from other breaks. Why these first breaks should give some millers so much trouble is traceable to themselves. A great many take the flour from the first break and send it to a low grade, others send it with their shorts, and if they are told that first break flour properly handled can be successfully mixed and run into flour from the following reduction, they will not credit it. However, such is the case. Our largest and most successful mills to-day utilize this first break, and it should form a part of the clear or bakers flour of every well equipped mill. Margins are growing closer daily, competition stronger, and millers cannot afford to throw a product into low grade that if otherwise properly handled could be sold for two thirds more money. You sometimes hear them say "we only make from one to two per cent." but this amount in the course of a year is very large and millers cannot consistently permit this to pass unnoticed. I observe a great deal is being said about dirt—seam-dirt as it is called; one would think from the articles which appear monthly from manufacturers of "first break machines" that whole loads of dirt exist in the crease of the wheat-berry and that all the wheat-cleaners that could be put into a mill would not remove it, and in order to prepare the wheat for reduction to middlings, the berry must be split longitudinally through the crease to permit this large amount so claimed to drop out.

I would like to ask some of those millers who accept the teachings of the manufacturers of first break machines as logical, *why* our large mills pay so little attention to breaking the wheat at the first operation longitudinally through the crease. If seam-dirt exists, these in quantities sufficient to injure the flour of the first reduction, those that preside over those large mills, and certainly ought to know, are ignorant of it. Before proceeding further, I wish to say that I do not desire to be understood as claiming that splitting the berry through the crease is detrimental, or of no benefit, rather the reverse, but I do claim, and I do not hesitate to say that it has been thoroughly demonstrated, that when wheat is properly and thoroughly cleaned that the amount of crease-dirt not removed by such cleaning is so small as not to deteriorate or prevent mixing this first break flour with flour from the following reductions. It may be well for me to state here what is considered a proper and thorough cleaning of the wheat berry such for instance as would admit of using the first break flour with the flour from the following reductions. I will specify the number of machines used by mills that I am personally acquainted with, that are not taking out the first break products, but running it in with the balance and in doing so I will confine myself to enumerating the number of machines adapted to small mills; first, a separator, a little too large rather than just large enough; second, a smooth smutter with the same fault; third, two good brush machines: this comprises a line of cleaners if properly handled that would clean wheat usually received at the mill door. A fact to be borne in mind in the purchase of cleaners and one which I notice is frequently disregarded is thorough ventilation—"draft." The air currents of a wheat cleaner (especially brushes) should be as perfect and in fact are as indispensable as the draft required in purifying middlings; impurities should be drawn off as soon as detached from the wheat berry. To accomplish this, thorough currents of air must and can only be secured by using sectional brush machines. Solid brushes—brushes against brush, will not admit of thorough ventilation, hence their impracticability. What benefits, I would like to ask, can you possibly derive from a cleaner which permits its scourings to *fall*? It must be plain to the most careless observer that machines of the kind are not practical. Another point which I wish to draw your attention to is the adjustment of wheat cleaners. There is a wide difference—some admitting of no adjustment whatever; others necessitate the removal of case and then the adjustment can only be accomplished with a very limited degree of accuracy because in adjusting with a wrench, one brush at a time, it is impossible to have them uniform. A brush can only meet with favor with millers that will admit of mechanical accurate adjustment in all its parts, at the same time admitting of thorough strong currents of air which will immediately draw off beyond a doubt all impurities as soon as they are detached from the grain and I will reiterate before returning to the discussion of the crease-dirt theory, that a line of cleaners as specified above, properly handled, will admit of running their first break flour with the others without deteriorating it. It will not only admit of doing this but it will go further, and improve the quality of flour from every reduction from first to last, and this point must not be lost sight of. It will not only admit of utilizing your first flour to the best advantage but will improve the products that follow. In conclusion permit me to say to you that, you are running your first break elsewhere then with the product of the following ones, that the time is not far distant when competition which invaribly begets close margins will compel you to utilize this flour and by a proper cleaning of the wheat berry place it where it undoubtedly belongs. Many have a false idea as to where this dirt which they see comes from, where it is located on the berry. Some, no doubt exists in the crease, but a much larger amount adheres to the outercoating and ends of the berry. This in fact is where the dirt exists most extensively and it can be removed much easier before it is reduced than after. It would be policy for those contemplating adding a first break machine for the purpose of improving the color to first examine their wheat cleaner and by adjusting them make it possible to improve the color of their flour without the use of a break machine, or if this be found inadequate by the addition of another cleaner bring it up where it belongs. A fact which very many loose sight of in purchasing a first break machine of any kind is its tendency to flour portions of the berry—it may touch it very slightly but it is bound to produce some flour and middlings. Were it possible to make this first break and not commingle the dirt which for the want of adequate cleaning was permitted to go to the machine nominally cleaned with the flour. I could then see where their practicability lay, but as this cannot be accomplished I must still say to millers first clean your wheat then reduce it and not attempt to reduce it and clean at one operation because you can never do it successfully. OBSERVER.

LEXINGTON, Ky., Nov. 26, 1883.

## NEWS.

The John T. Noye Mfg. Co., of Buffalo, N. Y., refuse to furnish reports of the sales that they make, for publication in these columns. They have taken this step in deference to the wishes of a great many of their patrons, believing that the practice, as it has heretofore existed, does not convey the impression that it should.

Dead—James G. Allen, Leach's Store, N C.

Dead—D. Malonee, a miller at Franklin, N. C.

Elam Clarke, the Waterloo, Neb., miller, is dead.

Burned—Brown & Dederich's mill at Geneseo, Ill.

Burned—Hiram Blanchard & Sons, at Eastport, Me.

C. D. Depweg, miller at Minster, Ohio, has assigned.

Hiram Hodson, miller, South Bethel, Me., has failed.

Burned—A. W. Luinaberry's mill, at Bloomfield, Iowa.

Died—N. G. Jenkins, miller at Brookside, New Jersey.

F. Serrick, miller at Toledo, N. C., has made an assignment.

Burned—E. M. Georgie & Co.'s mill at Independence, Iowa.

Davis & Lumbeck succeed Davis & McCauley, at Sterling, Ill.

Burned—Geo. C. Harvey's mill, at Canton, O. Partially insured.

Foster & Co., millers at Ellsworth, Ks., is now Foster & Jaunsen.

Abraham Hay, miller at Chrisman, Ill., has made an assignment.

Foster & Janzen is now the name of the milling firm at Ellsworth, Ky.

O. Marsh & Co., Dodge City, Ks., are succeeded by Marsh & Reamer.

William Armstrong's mill at Lexington, Ky., burned recently.—Insured.

Stoddard & Flenner succeed Stoddard & Humphrey in the mill at Abilene, Ks.

Beardsley Grant, miller at Manson Depot, N. C., has failed and made an assignment.

A receiver has been appointed for the milling firm of H. H. Vocke & Bro., at Napoleon, N. C.

Birgin & Co., Miner, Ill., has ordered one Little Giant break machine from the Case Mfg. Co., Columbus, Ohio.

The Case Mfg. Co., Columbus, Ohio, have an order from A. A. Pears, Bakersville, Ohio, for one Case purifier.

The Case Mfg. Co., Columbus, Ohio, have an order from H. J. Hammond, Sepha, Mo., for break, scalper, purifier, etc.

The Case Mfg. Co., Columbus, Ohio, have an order for one pair additional rolls from Holmes & Ragan, Rome, Georgia.

The Case Mfg. Co., Columbus, Ohio, have lately shipped Sinker, Davis & Co., Indianapolis, Ind., one Little Giant break machine.

The Case Mfg. Co., Columbus, Ohio, have an order from O. B. Stewart, Athens, Ohio, for two pair rolls with patent automatic feed.

J. C. Bucher, Barnitz Station, Pa., has ordered two pair rolls with patent automatic feed from the Case Mfg. Co., Columbus, Ohio.

Thomas Bradford & Co., Cincinnati, Ohio, has ordered one Little Giant break machine from the Case Mfg. Co., Columbus, Ohio.

One No. 1 double purifier has been ordered by Yeager and S. Anderson, Portsmouth, Ohio, from the Case Mfg. Co., Columbus, Ohio.

L. D. Rohrer, Cumberland, Md., has ordered from the Case Mfg. Co., Columbus, Ohio, one patent automatic feed for his Hannah Rolls.

The Case Mfg. Co., Columbus, Ohio, have lately received an order from J. B. Crouch, State Center, Iowa, for one No. 1 double purifier.

A. Hinman, Perry, Ill., has placed his order with the Case Mfg. Co., Columbus, Ohio, for two pair rolls with patent automatic feed.

Geo. V. Hecker's (the N. Y. miller) country residence, at Orange Mountain, N. J., burned Nov. 19th with all its contents. Loss, $60,000.

The Case Mfg. Co , Columbus, Ohio, have an order from W. H. Stewart, Claysville, Pa., for one break and scalper making three seperations.

The Case Mfg. Co., Columbus, Ohio, have an order for one additional Bismarck roll from the Model Roller Mill Co., North Middeltown, Ky.

The Case Mfg. Co., Columbus, Ohio, have an order from I. T. Graham, Rockford, Iowa, for one pair bran rolls with patent antomatic feed.

Burned Nov. 21, the flouring mills at Aurorahville, Waukesha Co., Wis., owned by Carey Bros., and run by J. C. Williams. Insured for $4,000.

The Case Mfg. Co., Columbus, Ohio, have an order from R. C. Poage & Son, Ashland, Ky., for two patent automatic feed boxes for their Smith Purifier.

Joseph Sutphim & Co., the Middletown, Ohio, millers who were recently reported failed, are now reported to be effecting a compromise at 50 cents on the dollar.

Shaw's Mills, in Grove City, Mercer Co., Pa., were built by James Glenn, in the year 1792, and purchased and rebuilt by J. C. Shaw in 1852. Since then they have been remodelled, and are now doing a prosperous business.

The Cleveland Milling Co., of Cleveland, O., are putting in a 30x60 Reynolds-Corliss engine, from Messrs. Edw. P. Allis & Co., Milwaukee.

The Case Mfg. Co., Columbus, Ohio, have lately received an order from Wallis Blumer, La Crosse, Wis., for one Little Giant break machine to go in front of his rolls.

J. P. Shoemaker, Tenwick, Mich., has contracted with Edw. P. Allis & Co., for remodeling his mill, and will use a full line Allis rolls in Gray's noiseless belt frames.

D. & J. Morgan, Thurman, Ohio, have placed order with Messrs. Edw. P. Allis & Co., for six pair Allis rolls in Gray's noiseless belt frames, cleaning machinery, etc.

The Case Mfg Co., Columbus, Ohio, have an order from Graham Lederer, Enon Valley, Pa., for a little Giant break machine and two pair rolls with patent automatic feed.

The flouring mills at Bloomdale, Auburn County, Mich., owned by Wm. Killefer, were destroyed by fire Nov. 21, with considerable grain. The loss is $18,000; insurance small.

The Case Mfg. Co , Columbus, Ohio, have an order from A. F. Ordway & Son, Beaver Dam, Wis., for one Bismarck Mill to be placed in the mill of J. L. Brown & Co., Fox Lake, Wis.

The Case Mfg. Co., Columbus, Ohio, have received an order through Wm. Catlin & Co., their agents at Chicago, for a line of rolls, breaks, purifiers, etc., for Wm. Park, Urbana, Illinois.

The Case Mfg. Co., Culumbus, Ohio, are furnishing J. Miller, Duncan Falls, Ohio, with one Little Giant break machine and scalper making three separations, and two pair rolls with patent automatic feed.

W. B. Woodward, Horrs, Ohio, has contracted with Edw. P. Allis & Co., Milwaukee, Wis., for eight pair Allis rolls in Gray's noiseless belt frames, cleaning machinery, etc., necessary to remodel his mill to the roller system.

Dainton & Roth, Monterey, Wis., have placed their order with Messrs. Edw. P. Allis & Co., Milwaukee, Wis., for the outfit for remodeling their mill, including six pair Allis rolls in Gray's noiseless belt frames, centrifugal reels, etc..

Wm. Anderson & Co., Hamilton, Ohio, has contract d with Edw. P. Allis Co., Milwaukee, to remodel their mill to the roller system and have placed orders for the entire outfit with Edw. P. Allis & Co.; the contract embraces fourteen pair of Allis rolls in Gray's noiseless belt frames, reels, etc.

Messrs. Edw. P. Allis & Co., of the Reliance Works, Milwaukee, Wis., have secured an order from Schmidt Bros & Co., Oshkosh, Wis., for remodeling their mill and will furnish fourteen pair of Allis rolls in Gray's noiseless belt frames, they will also furnish a Reynolds-Corliss engine to drive the mill.

The Case Mfg. Co , Columbus, Ohio, have been awarded the contract of the Forest Mills Flour Co., Carthage, Mo., for a complete outfit for a gradual reduction mill on the Case system. Ten pairs of rolls in Bismarck frame will be used in this mill, in connection with the breaks, purifiers, centrifugal scalpers, etc., of the Case Mfg. Co.

Goodale Bros , Delhi Mills, Mich., have been contemplating a change to the roller system, and after carefully investigating the different systems, placed their order with the Case Mfg. Co,, Columbus, Ohio, for a complete outfit of breaks, rolls, purifiers, centrifugals, etc. Twelve pair of rolls will be used in connection with their breaks, purifiers, etc.

Sixteen pairs of Case rolls in connection with their breaks, purifiers, centrifugals, etc., will be used in remodelling Perrein Bros.' mill, at Detroit, Mich. These gentleman are among the largest and most successful millers in Michigan; they thoroughly investigated all the different roller systems, and finally placed their order with the Case Mfg. Co., Columbus, Ohio, for the complete outfit. The mill, when completed, will have a capacity of 200 barrels per day.

J. C. Bucher, Barnitz Station, Pa., has concluded that the only flour his customers wanted, was that made by the roller process, and in order that they could get it without going into "strange lands," concluded he would change his mill to the roller process. After carefully investigating the different systems, placed his order with the Case Mfg. Co., Columbus, Ohio, for a full outfit of breaks, rolls, purifiers, centrifugals, scalpers, etc., for a complete gradual reduction mill on the Case system. Mr. Bucher can rest assured that in the hands of the Case Mfg. Co. he will get a mill "second to none."

Sowers Bros. Mills, at Princeton, Ill. These mills have recently been changed from the stone to the roller or gradual reduction process of milling, by Stout, Mills & Temple, of Dayton, Ohio, on the Livingston system. They use one 9x15 Gilbert combination mill, four breaks; six pairs of Livingston belted rolls; one run of stone for fine middlings. The bolting programme by Mr. Jno. Livingston, with S. M & T. calls for eight reels, sixteen feet long, 1-12 foot grader and two short scalping reels; four Smith purifiers, and one Kirk and Fender centrifugal. They also have one bran duster, two flour packers, and necessary cleaning machinery. The millwright work was in charge of Mr. C. E. Goshert. It is 100 bbl. capacity. It was started without a hitch or change being made, and is running up to full capacity, producing work of the very best quality, a credit both to the owners and contractors.

The Mokena Roller Mills, of Lancaster, Ohio. These mills have just been started most successfully by Mr. J. P. McConnell, expert miller for Stout, Mills & Temple, of Dayton, Ohio. They are built upon the Livingston system, using the Gilbert combination mill for breaks, and the Livingston belted mills for finishing. The machinery complete together with plans and bolting diagram were furnished by Stout, Mills & Temple, of Dayton, O. Messrs. Martin, Fismer & Rietter, the proprietors, doing their own millwright work. This was under the superintendency of M. S. Plant. The machines used are as follows, capacity being 150 bbls. in twenty-four hours, viz: one Gilbert combination mill, six breaks, twenty-four inch rolls; three double Livingston mills; one pair of stone for corn; thirteen bolting reels; two excelsior centrifugals; three No 2 Smith purifiers; one No. 4 excelsior and one No. 5 Garden City purifier; one bran duster, together with all necessary cleaning works, flour packers, etc. These mills turned out first-class work from the start, no change whatever being necessary.

Fostoria Roller Mills. J. P. Warner, the enterprising miller of Fostoria, Ohio, has recently remodelled his mill to the gradual reduction system, having adopted the Livingston system, using the Gilbert combination, six break mill, for breaks, and the Livingston rolls for fluishing. The plans were made and programme and all the machinery furnished by the popular mill furnishers, Stout, Mills & Temple, of Dayton, Ohio. The machines used are as follows: One Gilbert combination, six break mill, 9x18 inch rolls; five pair of Livingston rolls; three Smith purifiers; three Martin centrifugals; eight bolting reels, besides necessary cleaning works, bran dusters, packers, &c. The mill has a capacity of 125 bbls. per twenty-four hours. Mr. Warner was so pleased with the results of the mill, and working of the rolls, that he has branded his flour the "Livingston Patent" and "Gilbert Fancy," after the inventors of the roller mills and milling engineers for S. M. & T., Messrs. J. Livingston and Henry J. Gilbert. This mill, like the others built by S. M. & T., of which we have heard lately, was started successfully, no changes being necessary. Thos. Thornburg, of Toledo, Ohio, superintended the millwright work.

The Ottawa Roller Mills, at Port Clinton, Ohio. Messrs. Kirk & Kirk, of Port Clinton, O., a beautiful little city, between Toledo and Sandusky, on the L. S. & M. S. R. R., and situated on the banks of Lake Erie, desiring to make the best possible grade of flour, not only for their local customers, but also to hold a large merchant trade, contracted recently with Stout, Mills & Temple, of Dayton, Ohio, for complete roller mill. It is built on the Livingston system, using the following machines, viz: One six break Gilbert combination mill, rolls 9x18 for breaks; three double Livingston mills for finishing; two bolting reels; two No. 2 centrifugal reels; four Smith purifiers, with necessary cleaning machinery. Notwithstanding they have to compete with an entire new mill in the same city, they are leading the trade, and those who know, says their flour excels any ever offered to the citizens of Port Clinton. The mill is running up to full capacity, and is a grand success in every particular. The plans, programme and machinery, machines, bolting chests, &c., were all furnished by Stout, Mills & Temple, Dayton, O., and the millwright work was superintended by Thos. Thornburg, of Toledo, Ohio.

Wood & Co's Harvard Mills, at Harvard, Ill. These mills, so long reputed as first-class "stone mills," succumbed to the fate of all such mills, and is now running on the Livingston gradual reduction system. This change was wrought by Messrs. Stout, Mills & Temple, Dayton, Ohio, contractors for complete mills, and manufacturers of roller mills and mill machinery, according to plans and programme of Jno. Livingston, their milling engineer. The machines used are as follows, viz: Ten pair of Livingston rolls in noiseless belt frames; one Gratiot first break and scalper; ten bolting reels, fourteen feet long; eight short scalping reels, three Smith purifiers, and two Garden City purifiers; two excelsior centrifugal bran dusters, cleaning machinery, flour packers, &c The mill is of 125 bbls. capacity, twenty-four hours. The contractors guaranteed to compete successfully with the best flour in that market, and the proprietors say they are doing it easily. They are more than satisfied with the mill. Mr. Frank Barton is the headmiller, and is as proud of his new mill as a peacock with his long tail. The success of this mill demonstrates the superiority of the "medium sharp or dull" corrugation; all other mills of note in the vicinity, using either extremely dull or sharp corrugation.

White Star Mills, of Cincinnati, O. This mill, so long having the reputation for being one of the most successful stone mills in the country, was compelled some time since, to lay down its honors to the roller system, so to speak. After thorough examination of the several systems now before the millers of the country, Messrs. E. H. Huntington & Co., proprietors, decided that, in their opinion, the Livingston system and rolls were the best, and consequently contracted with Stout, Mills & Temple, of Dayton, Ohio, for a 300 bbl. mill using that system and rolls. The outfit consists of eighteen pair of Livingston rolls in double belted frames, with patent aspirators on the breaks, together with six pair of large sized, old fashioned rolls, formerly used with stone and of the "gang" pattern; sixteen bolting reels of S. M. & T's manufacture, also eight scalping reels, two bran dusters, two centrifugals, three flour packers, five No. 3 and one No. 5 Smith purifiers, and complete line of cleaning machinery. The building and contents were placed in the hands of Stout, Mills & Temple's millwrights, under Mr. B. F. Peffer, and is now running with the most satisfactory results. They started up without a choke or change from any cause, and the demand for the flour is such that Messrs. Huntington & Co., are sorely pushed to fill orders.

Stout, Mills & Temple, of Dayton, Ohio, report the following new contracts they have obtained within the last two weeks, viz: Parsons Bros., Auburn, Maine, for a new 100 bbl. roller mill complete using one Gilbert combination mill, three double Livingston mills; two No. 00 and three No. 0 Smith purifiers; two No. 3 martin centrifugal reels; one six-reel bolting chest, S. M. & T. make; one three-reel bolting chest, S. M. & T. make; one one-reel bolting chest, S. M. & T. make; cleaning machinery, bran duster, dust collectors, &c., and all necessary shafting, pulleys, boxes, etc.; also one 125 bbl. mill complete, for James Skinner, of Aurora, Ill., using all Livingston rolls, necessary bolts, purifiers, centrifugals, cleaning machines, &c., and furnishing all the driving machinery, millwright work, &c ; also one 125 bbl. mill for House, Palmer & Co., Lockland, Ohio, using Livingston rolls, bolting chests of S. M & T. manufacture, necessary purifiers, centrifugals, cleaning machinery, &c., and furnishing all driving machinery, millwright work, lumber, &c. In short, they will take charge of the building and complete the mill. All three of the above mills will be built and programmed according to the Livingston system. S. M. & T., also report a large sale of Livingston & Gilbert mills to other contractors and individual millers. We may remark right here, that Stout, Mills & Temple ought not to complain of "dull season" in mill furnishing as yet.

The following are some of the recent orders received by Edw. P. Allis & Co., of the Reliance Works, Milwaukee, Wis :

F. Arpke, Franklin, Wis., a Gray's noiseless belt roller mill.

Yeo & Clark, Lacrosse, Wis., a Gray's noiseless belt roller mill.

A Gray's noiseless belt roller mill for Corning & Draw, Lyons, Kas.

Schrœder & Trottman, Cedarburg, a Gray's noiseless belt roller mill.

Wright Bros. & Co., Greenville, Mich., a Gray's noiseless belt roller mill

A J. Ordway & Son, Beaver Dam. Wis., a Gray's noiselers belt roller mill.

Bergen & Co., Minier, Ills., two pair Allis rolls in Gray's noiseless belt frames.

Luse & Ross, Waynesboro, two pair Allis rolls in Gray's noiseless belt frames.

Schœllkopf & Matthews, Niagara Falls, N. Y., a Gray's noiseless belt roller mill.

J. Richmond, Mattoon, Ills., two pair Allis rolls in Gray's noiseless belt frames.

J. A. Alexander, Berwin, Pa., six pair Allis rolls in Gray's noiseless belt frames.

B. F. Hottell, Ft Collins. Cal., two pair Allis rolls in Gray's noiseless belt frames.

Jones & Co., New York City, four pair porcelain rolls in Gray's noiseless belt frames.

W. W P. Clement, Gt. Bend, Kas., two pair Allis rolls in Gray's noiseless belt frames.

S. T. McCulloch, Pt. Royal, Pa., six pair Allis rolls in Gray's noiseless belt frames.

J. A. Delaney, Hatbard, Pa., seven pair of Allis rolls in Gray's noiseless belt frames.

Henry Dietz & Co., Bowlder, Col., two pair Allis rolls in Gray's noiseless belt frames.

C. A. Pillsbury & Co., Minneapolis, three pair Allis rolls in Gray's noiseless belt frames.

C. H. Nutter & Bros., Brighton, Ia., four pair Allis rolls in Gray's noiseless belt frames.

H. C. Bross, Lanesboro, Pa., two pair porcelain rolls in Gray's noiseless belt frames.

Swathel, Keyser & Peterson, Ann Arbor, Mich., a Gray's noiseless belt roller mill.

Pallack, Bellany & Co., Seater, Mo., two pair porcelain rolls in Gray's noiseless belt frames.

Washburn, Crosby & Co , Minneapolis, two pair Allis rolls in Gray's noiseless belt frames.

Dunlap & McLauer, Richmond, Va., two pair more of Allis rolls in Gray's noiseless belt frames,

Schwarz and Bergner, Pulcifer, Wis., two more pair of Allis rolls in Gray's noiseless belt frames.

New Ulm Roller Mill Co., New Ulm, Minn., two pair Allis rolls in Gray's niseless belt frames.

Camp, Geiger & Beebe, Union City, Pa., two pair porcelain rolls in Gray's noiseless belt frames.

Waggoner & Gates, Independence, Ia., six pair porcelain rolls in Gray's noiseless belt frames.

Wm. Wilson, Twine Lake, Minn., another No. two four break reduction machine purifier, etc.

Sidle, Fletchen, Holmes & Co., Minneapolis, five more pair of Allis rolls in Gray's noiseles belt frames.

Gt. Western Mfg. Co., Leavenworth, Kas., a Gray's noiseless belt roller mill for Maltingly Bros., Utica, Mo.

Webber & Maus, Winfield, Kas., a Gray's noiseless belt rollsr mill for A. J. & J. W. Ground, Augusta, Kas.

Harrington, Moorehouse & Milligan, Jefferson, Iowa, two pair porcelain rolls in Gray's noiseless belt frames.

Aug. Heine, Silver Creek, N. Y., ten pair Allis rolls in Gray's noiseless belt frames for S. Bigler, Painesville, O.

Bradford Mill Co., Cincinnati, Ohio, twelve pair Allis rolls in Gray's noiseless belt frames for C. B. Cook & Co., Cynthiana Ky.

Bass Foundry & Machine Works, Ft. Wayne, Ind. for Bowers & Weirick, Waterloo, Ind., eight pair of Allis rolls in Gray's noiseles belt frames and a Gray's noiseless belt roller mill for David Harpeter, Fowler City, Ohio.

Edw. Snyder, of Delaware, Ohio, is putting in a roller mill and has contracted with Edw. P. Allis & Co., Milwaukee, to furnish the outfit and including eleven pair Allis rolls and four pair porcelain rolls all in Gray's noiseless belt frames.

The Elevator & Milling Co., of Leavenworth, Kas., are putting in a complete all roller 250 bbl. mill and have contracted with Edw. P. Allis & Co., Milwaukee, Wis., for the complete mill, the mill when completed will contain twenty-two pair of Allis rolls in Gray's noiseless belt frames and will be a very complete mill when finished. The mill will be run by a 16x42 Reynold's Corliss Engine which is also furnished by Allis & Co.

Edw. P. Allis & Co. of the Reliance Works, Milwaukee Wis., recently received the following orders from the mill furnishing trade:

Wolf & Hamaker, Allentown, Pa.; two pair porcelain rolls in Gray's noiseless belt frames.

Iowa Iron Works Mill Building Co., Dubuque, Ia., four pair Allis rolls in Gray's noiseless belt frames.

The Miller Co., Canton, Ohio, a Gray's noiseless belt roller mill, for James Wellington, Anderson, Ind.

J. D. Edge, Minneapolis, Minn., ten pair of Allis rolls in Gray's noiseless belt frames, for Lovejoy & Sutton, Osceola Mills, Wis.

North Star Iron Works Co , Minneapolis, four pair Allis rolls in Gray's noiseless belt frames, for H. Albrecht, Smith Lake, Minn.

Haggerty, Hunter & Co , Peoria, Ill., eight pair Allis rolls in Gray's noiseless belt frames, for a contract they have in Illinois; and ten pair Allis rolls in Gray's noiseless belt frames, for W. H. Davis, Glasford, Ill.

Richards & Butler, Indianapolis, Ind., four pair Allis rolls, for jobs they have under construction; twelve pair of Allis rolls in Gray's noiseless belt frames, for Mt. Vernon Milling Co., Mt. Vernon, Ill.; six pair Allis rolls in Gray's noiseless belt frames, for E. W. Bishop, Watseka, Ill.

## ENGINE ITEMS.

Edw. P. Allis & Co., of the Reliance Works, Milwaukee, Wis., recently received the following orders for their celebrated Reynolds-Corliss engines:

The Winona Lumber Co., Winona, a 32x60 Reynolds-Corliss complete.

Wardell & Hinckley, Chicago, four Reynolds improved heaters, for their customers.

The Burlington Lumber Co , Burlington, Iowa, a pair of 10x12 twin engines for their saw mill.

The Henderson Cotton Mfg. Co., Henderson, Ky., *two* 26x60 complete, with boilers, heaters, etc.

Everhite Milling Co., Leavenworth, Kas. a 16x42 Reynolds-Corliss complete, with boilers, heater, etc.

The North Chicago Rolling Mills, Bay View, Wis., have placed an order for a 24x48 Reynolds-Corliss complete.

Kipp Bros., Milwaukee, Wis , a 16x42 Reynolds-Corliss complete, with heater, etc., for their new matrass factory.

The Minnetonka Elevator Co., of Wabasha, Minn., has ordered a 14x36 Reynolds-Corliss engine complete, with heater, etc.

J. M. Brunswick & Balke Co., Chicago, through Messrs. Wardell & Hickley, Chicago, have placed an order for a 20x48 Reynolds improved new style automatic cut-off engine.

---

"SHAKE SHTAYS IN."—"My boy Shake he comes a big shoke on me," said a pleasant faced farmer at the Gratiot Avenue Station yesterday.

"How was that?"

"Vhell, Shake was radder lazy und he eat more on der table ash two men. Last vheek he strikes on me for wages."

"Is he of age?"

"Oh, no. Shake was only sixteen. I don't pelief he can earn his poard mit any farmer, and so I tell him I vhas willing to poard und clothe him, und if some circus comes along I gif him fifty cents. Dot vhas goot enough for a boy of such an appetite. But vhat you pelief Shake does?"

"I dun no."

"He comes to town und drinks some peer und vhas arrested und sent up mit der workhouse for seexty days. If I take him out I have to pay $10 cash. Dot vhas a big shoke on me, und Shake he laughs all oafer himself."

"Why don't you leave him there to serve his time? He gets his board and clothes, and you have nothing for him to do at home in the winter."

"By Shiminy, but I nefer tought of dot pefore. Dot's so. Shake vhas no goot at home, und vhas only expense on me. If I doan pay dot $10 den he shtays in."

"And the joke is on him."

"Dot's so – dot's so. If I take him out he laugh pehind my pack mit der poys. I leaf him in; I go oop to see him once a vheek und makes some grins und ask him how it vhas so far as he goes. Shake shtays in. Ha! ha! ha! I vhas tickled already."—*Detroit Free Press.*

---

If you think the water you use regularly for drinking is impure, try the following test: Put 1½ pints of water into a clean glass bottle; add to it a teaspoonful of pure white sugar, cork it and shake until the sugar is well dissolved and then set in a warm place for 48 hours. If it is unfit for drinking it will be turbid and milky at that time.

Ruskin says: An educated man ought to know these things; First, where he is—that is to say, what sort of a world has he got into; how large it is, what kind of creatures live in it, and how; what it is made of, and what may be made of it. Secondly, where he is going—that is to say, what chances or reports there are of any other world besides this; what seems to be the nature of that other world. Thirdly, what he had best do under the circumstances—that is to say, what kind of faculties he possesses; what are the present state and wants of mankind; what is his place in society; and what are the readiest means in his power of attaining happiness and diffusing it. The man who knows these things, and who has his will so subdued in the learning of them that he is ready to do what he knows he ought, is an *educated* man; and the man who knows them not is uneducated, though he could talk all the tongues of *Babel.*

### 1884.
### HARPER'S MAGAZINE.
ILLUSTRATED.

*Harpers' Magazine* begins its sixty-eighth volume with the December Number It is the most popular illustrated periodical in America and England, always fully abreast of the times in its treatment of subjects of current, social and industrial interest, and always advancing its standard of literary, artistic, and mechanical excellence. Among its attractions for 1884 are: a new serial novel by WILLIAM BLACK, illustrated by ABBEY; a new novel by E. P. ROE, illustrated by GIBSON and DIELMAN; descriptive illustrated papers by GEORGE H. BOUGHTON, FRANK D. MILLET, C. H. FARNHAM, and others; important historical and biographical papers; short stories by W. D. HOWELLS, CHARLES READE, &c.

### HARPER'S PERIODICALS.
PER YEAR:

| | |
|---|---|
| HARPER'S MAGAZINE | $4 00 |
| HARPER'S WEEKLY | 4 00 |
| HARPER'S BAZAR | 4 00 |
| HARPER'S YOUNG PEOPLE | 1 50 |
| HARPER'S FRANKLIN SQUARE LIBRARY, One Year [52 Numbers] | 10 00 |

*Postage Free to all subscribers in the United States or Canada.*

The volumes of the *Magazine* begin with the Numbers for June and December of each year. When no time is specified, it will be understood that the subscriber wishes to begin with the current Number.

The last Eight Volumes of *Harper's Magazine*, in neat cloth binding, will be sent by mail, postpaid, on receipt of $3.00 per volume. Cloth Cases, for binding, 50 cents each—by mail, postpaid.

Index to *Harper's Magazine*, Alphabetical, Analytical, and Classified, for Volumes 1 to 60, inclusive, from June, 1840, to June, 1880, one vol., 8vo, Cloth, $4.00.

Remittances should be made by Post-Office Money Order or Draft, to avoid chance of loss.

*Newspapers are not to copy this advertisement without the express order of* HARPER & BROTHERS.

Address HARPER & BROTHERS, New York.

### 1884.
### HARPER'S WEEKLY.
ILLUSTRATED.

*Harper's Weekly* stands at the head of American illustrated weekly journals. By its unpartisan position in politics, its admirable illustrations, its carefully chosen serials, short stories, sketches, and poems, contributed by the foremost artists and authors of the day, it carries instruction and entertainment to thousands of American homes.

It will always be the aim of the publishers to make *Harper's Weekly* the most popular and attractive family newspaper in the world, and, in the pursuance of this design, to present a constant improvement in all those features which have gained for it the confidence, sympathy, and support of its large army of readers.

### HARPER'S PERIODICALS.
PER YEAR:

| | |
|---|---|
| HARPER'S WEEKLY | $4 00 |
| HARPER'S MAGAZINE | 4 00 |
| HARPER'S BAZAR | 4 00 |
| HARPER'S YOUNG PEOPLE | 1 50 |
| HARPER'S FRANKLIN SQUARE LIBRARY, One Year (52 Numbers) | 10 00 |

*Postage Free to all subscribers in the United States or Canada.*

The Volumes of the *Weekly* begin with the first Number for January of each year. When no time is mentioned, it will be understood that the subscriber wishes to commence with the Number next after the receipt of order.

The last Four Annual volumes of *Harper's Weekly*, in neat cloth binding, will be sent by mail, postage paid, or by express, free of expense (provided the freight does not exceed one dollar per volume), for $7.00 per volume.

Cloth Cases for each volume, suitable for binding, will be sent by mail, postpaid, on receipt of $1.00 each.

Remittances should be made by Post-Office Money Order or Draft, to avoid chance of loss.

*Newspapers are not to copy this advertisement without the express order of* HARPER & BROTHERS.

Address HARPER & BROTHERS, New York.

### 1884.
### HARPER'S BAZAR.
ILLUSTRATED.

*Harper's Bazar* is at once the most brilliant and useful Household Journal in existence. It is the acknowledged arbiter of fashion in this country. Its fashion plates are the newest and most stylish; and its pattern sheet supplements and economic suggestions alone are worth many times the cost of subscription. Its illustrations of art needlework are from the best sources. Its literary and artistic merits are of the highest order. Its stories, poems and essays, are by the first American and European authors. Its choice art pictures would fill portfolios, and its humorous cuts are the most amusing to be found in any journal in America. A host of brilliant novelties are promised for 1884.

### HARPER'S PERIODICALS.
PER YEAR:

| | |
|---|---|
| HARPER'S BAZAR | $4 00 |
| HARPER'S MAGAZINE | 4 00 |
| HARPER'S WEEKLY | 4 00 |
| HARPER'S YOUNG PEOPLE | 1 50 |
| HARPER'S FRANKLIN SQUARE LIBRARY, One Year (52 Numbers) | 10 00 |

*Postage Free to all subscribers in the United States or Canada.*

The Volumes of the *Bazar* begin with the first Number for January of each year. When no time is mentioned, it will be understood that the subscriber wishes to commence with the Number next after the receipt of order.

The last Four Annual Volumes of *Harper's Bazar*, in neat cloth binding, will be sent by mail, postage paid, or by express, free of expense (provided the freight does not exceed one dollar per volume), for $7 00 per volume.

Cloth Cases for each volume suitable for binding, will be sent by mail, postpaid, on receipt of $1.00 each.

Remittances should be made by Post-Office Money Order or Draft, to avoid chance of loss.

*Newspapers are not to copy this advertisement without the express order of* HARPER & BROTHERS.

Address HARPER & BROTHERS, New York.

### 1884.
### HARPER'S YOUNG PEOPLE.
AN ILLUSTRATED WEEKLY—16 PAGES.

**Suited to Boys and Girls of from Six to Sixteen Years of Age.**

**Vol. V. Commences November 6, 1883.**

HARPER'S YOUNG PEOPLE is the best weekly for children in America.—*Southwestern Christian Advocate.*

All that the artist's skill can accomplish in the way of illustration has been done, and the best talent of the country has contributed to its text.—*New England Journal of Education, Boston.*

In its special field there is nothing that can be compared with it.—*Hartford Evening Post.*

TERMS

**HARPER'S YOUNG PEOPLE, Per Year, Postage Prepaid.** ..... $1.50.

SINGLE NUMBERS, Five Cents each.

Specimen copy sent on receipt of Three Cents.

The Volumes of *Harper's Young People* for 1881, 1882 and 1883, handsomely bound in Illuminated Cloth, will be sent by mail, postage prepaid, on receipt of $3 00 each. Cloth Cases for each volume, suitable for binding, will be sent by mail, postpaid, on receipt of 50 cents each.

Remittances should be made by Post-Office Money Order or Draft, to avoid chance of loss.

*Newspapers are not to copy this advertisement without the express order of* HARPER & BROTHERS.

Address HARPER & BROTHERS, New York.

## MILWAUKEE DUST COLLECTOR MFG. CO.,
SOLE MANUFACTURERS OF THE IMPROVED

# Prinz Patent Dust Collector.

**THE ONLY RELIABLE ONE ON THE MARKET!**

**The Back Draft Cleaning Mechanism is the only Perfect Device for keeping the Cloth Clean.**

**EXCLUSIVELY USED UNDER THE PRINZ PATENTS.—BUY NO OTHER.**

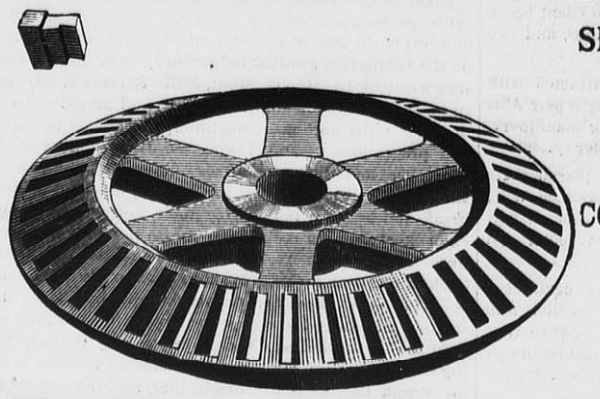
**MACHINES WITHOUT FANS! — MACHINES WITH FANS!**

**Licensed Exclusively under all Patents of any Value.**

**LOW PRICES FOR EXCELLENT MACHINES.**

ADDRESS FOR PARTICULARS, **Milwaukee Dust Collector Mfg. Co., Milwaukee.**

# Power Transmitting Machinery.



SHAFTING,
HANGERS,
PULLEYS,
COUPLINGS,
AND GEARS
A SPECIALTY.

## The Paige Manf'g Co., Painesville, Ohio.

### MILL FOR SALE CHEAP.

A good grist and custom mill for sale, situated seventy miles from Chicago, on the N. W R. R., forty rods from depot. A frame building, 45x30 feet, two stories and basement; contains three run of buhrs, smut-machine (new); two bolts; one purifier; corn sheller, all in good working order, and driven with 84-inch turbine; never failing stream of water; also four acres of land, with barn and piggeries; to be sold at an immense sacrifice. Write or apply to,

FRANK DARE,
Garden Prairie, Brown Co., Ill.

WANTED—A PARTNER, with $4,000 to $5,000 to put in the roller system in my mill. I have sufficient water-power, eight months in the year, to run 25 sets of rolls, and for four months I use steam. Address for further particulars,

F. A. WHEELAND,
Platte City, Mo.

### THE YOUTH'S COMPANION.

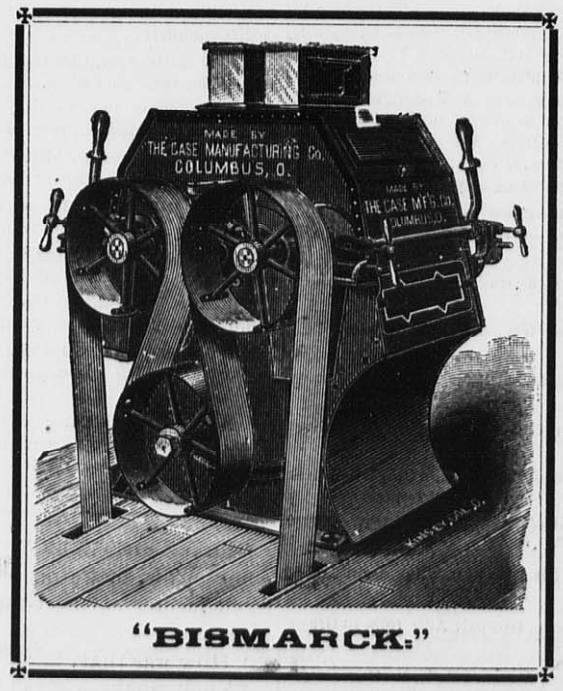
As a source of profitable entertainment for the family no paper exceeds in interest the YOUTH'S COMPANION. Its list of writers embraces the best names in periodical literature, and it is evidently the aim of its editors to secure not only the best writers, but the best articles from their pens. It is a remarkable thing for a single paper to obtain such a succession of lively and brilliant stories and illustrated articles. While the COMPANION is in the main a story paper, the mental, moral and religious training of young people is an end kept steadily in view. Its articles on current topics are written by the most qualified pens, and present, in a clear, vivid direct way, the fundamental facts of home and foreign politics, and all public questions. Its original anecdotes of public men are invaluable in their influence in stimulating right ambition and a high purpose in life. Every household needs the healthy amusement and high moral training of such a journal. It is published by PERRY MASON & Co., of Boston, who will send specimen copies upon application.

# THE CASE MANUFACTURING CO.!

Eagle City Mills, Clark Co., O., Nov. 6th, 1883.

***To the Case Manufacturing Co., Columbus, O.***

GENTLEMEN:—I hand you herewith the notes in settlement for my mill as per contract. We have not yet run the length of time specified in the contract as a test run, but everything is running splendidly, and I see no reason to delay the settlement. Our Flour is ***"way up;"*** we have found none to surpass it. We have not changed a foot of Bolting Cloth or a spout, and see no necessity of doing so. We were notified by our neighbor millers who have had experience in changing over their mills, that when we started our troubles would begin, but we have had no trouble and not an hour's stoppage except to take up belts, which always has to be done in starting new mills.



"BISMARCK."

The Flow of Stock as made out by Mr. Case is perfect, and we feel happy to-day that we placed our order with a firm who have the talent to build a Mill, that does not require constant remodeling. The Feed on the Rolls and Purifiers is just a perfection. We don't have to employ a man to keep the feed running; it just takes care of itself. We regulate the amount of wheat going to the first Break, and every other Roll in the mill takes care of itself, and we have never found a moment but what the material was spread the entire length of the Roll. There is no question of doubt but what the Case "BISMARCK" is the Prince of Rolls, and if I were building another mill I should certainly use no other. We invite Flour Merchants and Inspectors to call and see our little mill. We believe we are at the "Top of the Heap." Yours truly,

S. R. HOCKMAN & SON.